COAL AGE

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The Boss' Chair—Could You Fill It?

An open letter to the boys who are not yet bosses.

By one who belongs to the same lodge.

IF you fellows are anything like me—and I don't care whether you are a wage earner or a salaried man—your working hours for the last twelve months have been punctured with thoughts of how much money the concern is making and how little of it you are getting. You have stopped working many times to frame a suitable speech to make to the boss to remind him that you have been somewhat overlooked in these good times. You have figured that just because the concern was making more money you were entitled to some of it.

In fact, too many of you have made your little speech and got your little raise, and now you are satisfied. Strange as you may think it, that is probably the worst thing that could have happened to you. Getting a raise is, for many men, a really hurtful thing. It leads to a state of perfect content with one's work and makes him forgetful of the real job ahead of him.

I am afraid there are too many of us fellows who are not yet bosses, who do not properly appreciate our own bosses and their jobs. Too few of us are working with the view of being able and ready to grab the boss' job when the chance comes. That state of unpreparedness we hear so much of nowadays has us in its grip too. In plain English, most of us want a RAISE rather than a PROMOTION.

Like hundreds of the rest of you, I recently asked for my raise. I wasn't thinking of anything else when I tackled the boss; but, believe me, I had other ideas in my mind when I left him.

Briefly, he told me he could give me a raise, but he would like to know if I had made up my mind to follow the mining business for good. "If so," he said, "you want to begin to think more about a promotion than you do of a raise."

He was good enough to point out how a fellow at my age should be thinking less of what his earnings are now as compared to getting ready to handle a real job later on. The pay, he told me, nearly always took care of itself.

There wasn't much more said. I went back to my work with a new comprehension and appreciation of what my job meant to me. I didn't get a raise, and I'm darned glad of it. But I got something a whole lot better: I got a vision of a REAL JOB in the future if I am willing to get ready for it.

That's all—except this: I make it a point about once a week to look at the boss' chair when he is out on the job, and I ask myself if I am doing all I can to be ready for that promotion.

There it is—The Boss' Chair. How many of us can fill it?

New Mining Method in the Connellsville Region*

By Patrick Mullen†

SYNOPSIS—A high degree of concentration, intensive mining and above all intensive supervision are conducive to increased safety and a greater output per man. The H. C. Frick Coke Co. has developed a system of operation whereby these results are secured.

The new mining method here described is practiced by the H. C. Frick Coke Co. in the Connellsville region and is the application of shortwall mining machines to the extraction of rib coal.

The two salient factors effecting this result were, first, the effort to reduce accidents and second, the desire to obtain an increased output of coal per man per day.

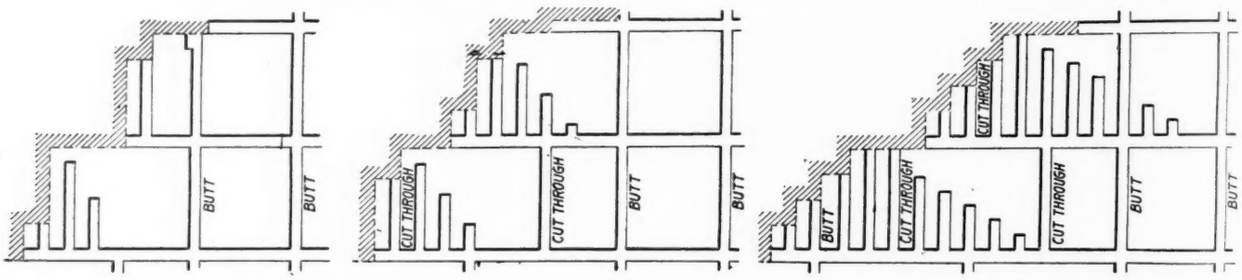
It has long been realized that the more intense the supervision of working places and workmen the less liability there is to accident. In order to obtain the desired supervision without making the cost prohibitive, it was seen that the time spent by mine officials in traveling from working place to working place must be reduced to the minimum and the time actually spent in working places increased to the maximum. To obtain this result the working places were concentrated gradually, and it was soon found that, under the old method of pick mining, a limit was quickly reached, and it was realized that to obtain the desired intensive supervision it was necessary to decrease the number of working places and workmen. This could only be accomplished by an increased production from each miner and a consequent reduction in the number of working places without affecting the total output of the mine.

To obtain the increased output per man we turned to machines, but on account of the conditions in the Connellsville region, where it is necessary to drive narrow headings, narrow rooms and have large room centers, it was found that machines in the narrow work would not accomplish the result since the bulk of the coal comes from rib extraction. We knew of no application of machine mining to rib extraction and attacked the problem without any precedent to guide us. In the effort to evolve a method by which mining machines could be applied to the extraction of ribs, the management assigned me to this particular work and my time and efforts were entirely devoted to it.

The general shortage of labor that usually exists in this country at times when business is thriving was also an important factor in urging the solution of this problem.

The success that has been obtained has resulted as much from the hearty coöperation of those in every department of our company as from my own efforts.

The use of electrically driven mining machines and the blasting of coal on the very rib line itself requires a system of ventilation that will insure gob gas being found only on the return. Such a system of ventilation necessitates ample, reliable fan equipment, airways of sufficient size and number, a generous provision of upcast openings, wise coursing of the air current and the existence of numerous bleeders from every gob into a return airway. It also demands the elimination of danger from dust by keeping it sprinkled and removing it before any dangerous accumulations are found. In addition it demands the use of permissible explosives and these only in the hands of selected competent shotfirers.



FIGS. 1 TO 3. SHOWING MINIMUM, MEDIUM AND MAXIMUM PLANS OF EXTRACTION

It has been proved that working places cannot be concentrated to as great an extent by any system yet tried in the Connellsville region as by the use of the H. C. Frick Coke Co.'s system of machine mining in rib coal. On account of the intense concentration of working places and the output that is obtained it is necessary that the haulage arrangements and equipment be perfected beyond anything that had previously been necessary, and the transportation of coal cannot well be handled except by the use of electric gathering locomotives.

The general plan by simple modifications can be made to suit all conditions; depth of cover; presence or absence of drawslate; nature of coal, and the nature of bottom and roof. This is divided into what we know as maximum, medium and minimum plans.

The maximum plan is applicable where thickness of overlying cover does not exceed 125 ft. and where the coal is hard and the general physical condition of roof and bottom is good.

The medium plan is applied where the cover does not exceed 250 ft. with the same physical conditions of coal and bottom and roof as obtain under the maximum plan.

The minimum plan may be applied to coal underlying any depth or thickness of cover, and whether or not the coal is hard or soft and the physical condition of roof

*Paper read before the Engineers' Society of Western Pennsylvania.

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and bottom good or bad, provided, of course, that mining machines in any form can be used.

The H. C. Frick Coke Co. has always worked its mines according to a projection, carefully prepared, for the field of coal to be worked before actual excavations have been started. In this plan of concentrated mining it has been found of great advantage to supplement these general projections with a schedule, prepared on a scale of 20 ft. to the inch, showing in detail the daily operations.

It should be understood that in the shortwall plan of mining the development is made on the face and the butt of the coal. After it has been determined as to what plan is to be followed for a given tonnage, the mining section is projected and developed and a fracture line established.

Let us first consider the minimum plan of production. The main haulage headings are driven on the face as are also the return airways while the producing headings are on the butt. Off these producing headings main face rooms are turned, generally on 112-ft. centers. From these main face rooms, butt rooms are driven on 25-ft. centers. As the main face rooms advance the necks of the butt rooms to be driven are excavated to a depth of three machine cuts. After this main face room has been advanced 50 ft. there are available two places for the machine to cut that will yield 40 tons, and when it advances to a point where the first crosscut is turned off, there are three places to cut in each main face room, yielding 60 tons. This main room may continue to the end of the section or to the end of the coal field, turning butts or producing headings off at projected distances. The main face rooms being driven on 112-ft. centers and 12 ft. wide leave a pillar 100 ft. in thickness between the rooms. This pillar we consider ample to support any thickness of cover with a floor or bottom under the coal seam of any nature that may be found in the Connellsville region.

On this minimum plan of production, where main rooms are advanced sufficiently far to begin the extraction of main face room pillars, the butt rooms are advanced in succession so that each room is 50 ft. behind the one next preceding. This plan provides for a tonnage output from three working places—two butt rooms advancing furnish 40 tons and one butt rib retreating provides an additional 40 tons, or a total of 80 tons of coal while retreating; and the main face room advancing is yielding 60 tons, or a total of 140 tons of coal from one main face room properly prepared and developed on this minimum plan of production.

Along the same lines the medium plan will not yield any greater tonnage from the advancing main rooms, but on the retreat the butt rooms are so driven as to maintain each face 30 ft. behind that of the preceding room. This allows three butt rooms to advance at a time, producing 60 tons, and necessitates two butt ribs retreating at the same time, giving a production of 80 tons, or a total from the butt rooms of 140 tons. This with the production of 60 tons from the advancing main room totals 200 tons for each main room.

In the maximum plan the main face rooms advancing produce 60 tons while the butt rooms are so driven that the face of one is 15 ft. behind the face of the preceding room, thus necessitating four advancing butt rooms and the simultaneous withdrawal of four butt ribs. The four advancing butt rooms will produce 80 tons while the four retreating butt rooms will produce 160 tons. The sum of these, together with the 60 tons produced by the advancing main room, gives a total tonnage of 300 for each main room.

The work is thoroughly systematized and the routine can be described as follows: After the miner has cleaned up his place and the day's run is completed the machine crew enters and cuts the place to a depth approximating 7 ft. The timbermen follow the machine crew, resetting any posts that it has been necessary for the machine men to remove. They post up any crossbars that have been notched in the coal over the machine cut, and generally put the place in good condition, following out a prescribed system of timbering. The timbermen are followed by the driller, who bores the holes for blasting

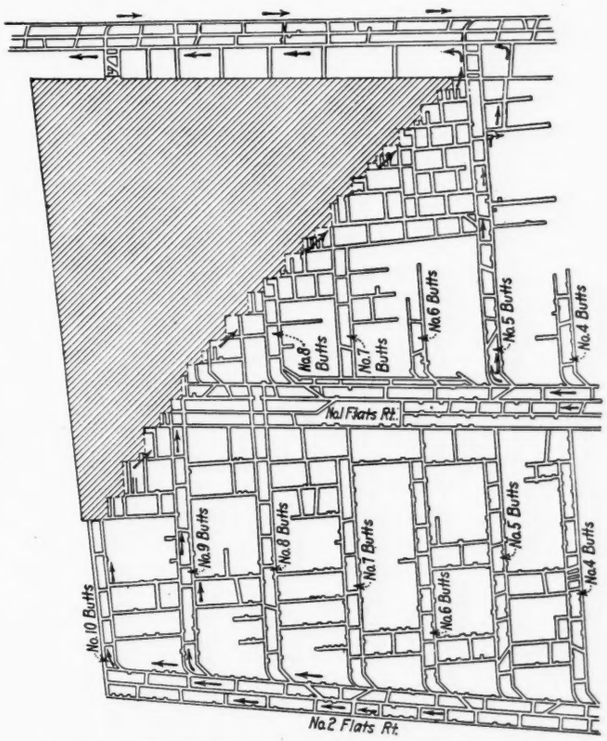


FIG. 4. CONCENTRATED MINE WORKINGS AT CONTINENTAL NO. 2 MINE

with an electrically operated power drill. The driller is followed by the shotfirer, who charges the hole, tamps it, and after his own personal examination of conditions, explodes the charge, blasting down the coal ready for loading. After the coal has been blasted empty cars are placed by the gathering locomotives preparatory for the next day's work, so that when the loader arrives at his working place in the morning it is in a safe condition and every facility has been given him to load a maximum tonnage. Especial pains are taken through the day to see that wagons are changed as soon as loaded, thereby eliminating all unnecessary loss of time and allowing the men to load a maximum tonnage in the minimum time.

Actual results obtained regularly with miners loading under these conditions are 18 to 20 tons per man per shift; the average of all the loaders behind shortwall mining machines in all mines of the company for the month of August, 1916, was approximately 19 tons per shift.

The scale of rates for the Connellsville region apply only to that locality and may not be interesting at this time, but all cutting, scraping, loading and drilling are paid for on a piece-work basis; the laying of track, timbering, shooting, hauling and supervision are all on a day-work basis.

At mines where there is a full equipment of mining machines the proportion of machine coal amounts to from 80 to 95 per cent. of the total output.

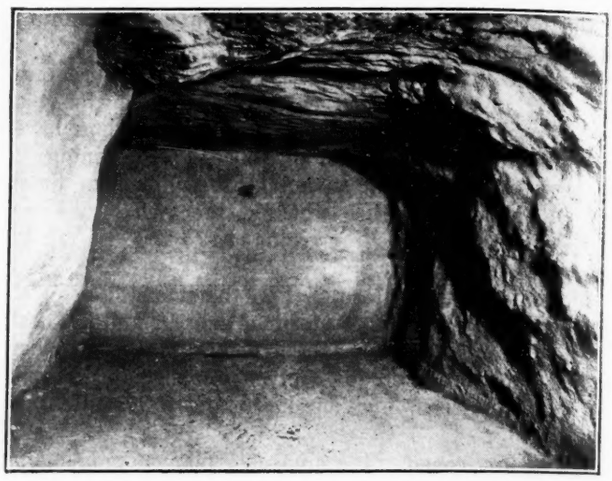
From the concentration that has been obtained by this method there has resulted a decrease in the cost of transportation, ventilation, track work and drainage, owing to the smaller area in active operation. There is also a considerable saving in the amount of money invested in track material and material generally used in the mine, arising from the same cause.

Preventing Roof Slacking

The extremely hot weather during the past summer has been the cause of considerable roof slacking in the various bituminous fields, to a greater degree than has been the case for several previous years. This has been so marked in numerous instances as to cause the focusing of attention on some method of protecting these surfaces against the attacks of air and moisture. It seems pertinent, therefore, in this connection to call attention to the satisfactory results that have been obtained in two instances through the use of the cement gun.

Early in 1914, L. M. Jones, mining engineer in charge of the Coal Mining Department of the Bureau of Mines, used a cement gun to line the two slope entries at the Experiment mine, near Bruceton, Penn. His reason for making this lining was that when it was determined to use this mine for the purpose of making explosion tests with anthracite dust, the anthracite operators objected because they felt that there would be present a large amount of bituminous dust which would affect the conditions.

The inner end of the main slope and the air entry, for about 360 ft. of each, were therefore coated with "gunite" and brushed fairly smooth to insure against the possibility of bituminous dust finding a lodgment there. This left the two entries, each of which is about 1,300 ft. long, with an entrance lining of concrete for 300 ft., an untreated



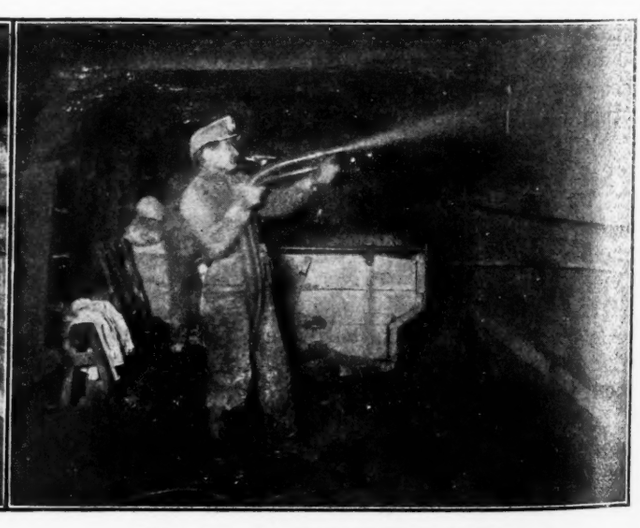
GUNITED ROOF AND RIBS

length of 650 ft. and a gunited portion as noted above. This work was completed early in the fall. The explosion tests were started about Oct. 15 and have continued at the rate of about three explosions per week ever since, except during the summer months, or between about May 15 and Oct. 15.

At the time that the guniting was done, there was marked indication of slacking taking place along the sides of the entry, and along the uncovered portion these now exist to a considerable degree. In the covered portion, however, there is no indication of slacking having advanced at all, as the sides are entirely unbroken and there has been no scaling. There are, as would be expected, a number of places where slabs of the mortar have broken away from the roof, owing to the heavy explosions. These have been patched by hand, as the bureau has not had a cement gun available for such work.

When the bureau finished with the cement gun at Experiment, it was sent to the H. C. Frick Coke Co. at Mount Pleasant, Penn., and was used by the superintendent, James Mack, for a similar purpose. Considerable trouble had been experienced at this mine with the roof and sides of the entry approaches to the shaft level slacking, and a coating varying from $\frac{1}{16}$ in. to 4 in. or more was shot on. This protection has been so successful

READY TO USE THE CEMENT GUN



THE CEMENT GUN IN OPERATION

that no further work of any character has been necessary in two years along the coated portions.

In coating the surfaces of the entries at Experiment, Mr. Jones kept accurate costs of the work. These are as follows:

Entry	
Size of entry	5.9 (height) by 9.15 ft.
Lineal feet coated	358
Square feet coated	8,100
Cost of labor (including supervision)	$172.64
Material	114.38
Total	$287.02
Cost per square foot, labor	$0.0213
Cost per square foot, material	.0141
Labor and material, per square foot	$0.0354
Cost per foot advance	$0.76
Cost per square yard	.319
Speed	4.7 lin.ft. or 11¼ sq.yd. per hr.
Air Course	
Square feet coated	8,925
Lineal feet coated	425
Cost of labor (supervision not included)	$232.38
Materials	161.81
Total	$394.19
Cost per square foot	$0.0441
Cost per foot advance	.928
Cost per square yard	.397

The depth of covering ranged from about ¼ in. to 4 in., but Mr. Jones advises that it would be best to use a minimum of ½ in. and states that it is not necessary to build out the low places to a continuous surface, as was done by the bureau because of explosion conditions.

Inasmuch as this work, if as successful as the above experiences would indicate, would save an annual expenditure in some cases running into thousands of dollars, besides meaning the saving of an original cost of timberwork and the guarding against many operating delays, it would seem that these experiments warrant the careful consideration of every mine superintendent and engineer in the country.

Are Boats for Lake and Ocean Traffic Practicable?

J. R. Coutlee, engineer-in-charge, Ottawa River Storage, makes the following interesting comments on this question in a recent issue of the *Engineering News:*

We considered this matter in connection with the design of the Georgian Bay canal, and it is still a very interesting subject. It is generally considered that the highly specialized ore boat used on the Lakes is too long, too lightly built and not of deep enough draft for the ocean. The engines astern and ballast-tank system would not quite suit, and the condensing apparatus would have to be different.

On the completion of the Soulanges canal in 1900, several Clyde-built boats 250 ft. long, 43 ft. beam and 14 ft. draft came out to ply on the Great Lakes. The first difficulty was that the steering gear was too slow for canal and Lake channel work; next, the hatches were not spaced to suit the loading and unloading machinery of Lake ports. The wage rate of the salt-water crew was less than half the rates paid on the Lake; consequently, the men promptly deserted. The rules of navigation on the Lakes are different and also the bell signals, while the modernized Lake chart might puzzle some of the old sea dogs.

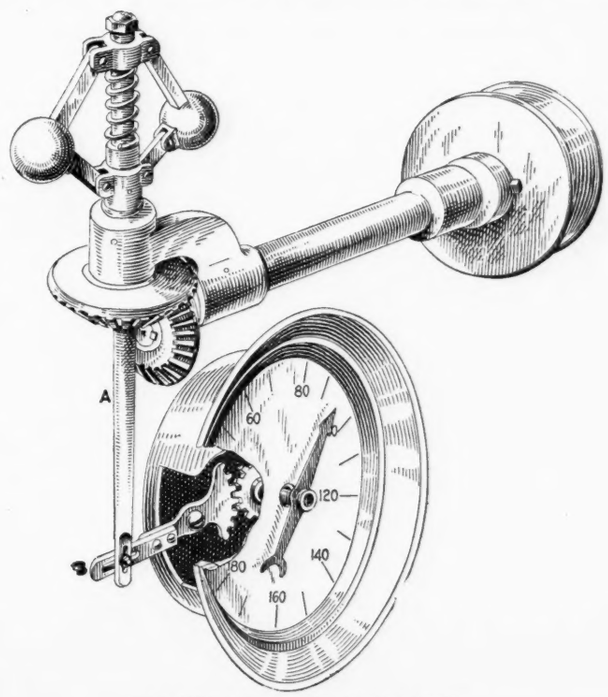
In general, the Lake traffic is a highly organized and highly specialized business; 80 per cent. of it consists in carrying iron ore from Superior to Erie and coal back. The ore carrying, however, is materially different from the system used in the ore traffic between Spain and Great Britain. The old "hog" type of vessel was tried on salt water, but proved very unpopular with the crews. The seas pounding on the whale-back deck prevented sleep and also regular meals, and eventually the construction was found to be too weak.

The St. Lawrence indents America as deeply as the Mediterranean penetrates the eastern hemisphere, and ocean vessels must some day ply regularly up to Superior. The St. Lawrence valley is surely destined to be the greatest traffic artery in the world.

New Duties for Old Equipment

An improvised speed-indicating gage was made as follows for attachment to variable-speed shafting, where it was desirable to observe and to alter the speed in accordance with differing requirements:

A small governor, taken from a discarded high-speed engine, is belted to the shafting. The valve stem *A* is



SHAFTING SPEED INDICATOR

lengthened to reach the lever *B* of an old steam gage, as shown, and a portion of the gage casing is cut away to accommodate the changed mechanism. The pressure tube is eliminated. The lever *B* is made adjustable as to length, so that by changing it the gage is set in proper ratio, making the original dial graduation correspond to the speed of the shafting.—H. K. Scholefield in *Power.*

The Purchase of Coal by the Government under specifications depending on the heating value of the coal, its content of ash and of moisture, and other considerations, rather than upon the reputation or trade name of the coal, was based on the fuel investigations begun by the Technologic Branch of the United States Geological Survey in 1904. The plan was first adopted by the Treasury Department in 1906. Since then the plan, variously modified in form, but the same in principle, has been gradually adopted by other departments until, at present, of the coal used by the Government, the total value of which approximates $8,000,000 annually, more than half is purchased under specifications.

The Chemistry of Mine Water

By C. M. Young*

SYNOPSIS—The amount of water that finds its way into a mine depends upon many circumstances, chief among which is the porosity of the overlying strata. The chemical reactions taking place in water during its percolation through the earth are many and complicated. Heretofore the treatment of mine water has been carried on chiefly with the idea of reducing its corrosive effect. It would appear that the constituents removed, if put to commercial use, might assist to some extent in paying the expense of treatment.

Taking it the world over there is, perhaps, no one thing that adds more to the expense and difficulty of coal mining than the water encountered in mines. Aside from the discomfort that it causes, it gives trouble in two principal ways: First, in most cases it must be pumped; and the pumping of an amount of water ranging up to 16 or 17 tons per ton of coal mined entails considerable expense and is a tremendous problem; second, the water is often corrosive and causes trouble by its action upon the metal of pumps and pipes.

The quantity of water found in any mine depends upon the extent to which the workings tap water-bearing strata and the amount of water in the overlying measures. A new mine, the development of which has not proceeded far, will produce less water than an old one, because there is smaller opportunity for the water to escape into the limited workings.

Permeability Governs Volume of Water

The amount of water in the strata depends upon the possibility of penetration by rain water, stream water or that circulating in the ground. The amount of rain water that reaches a mine depends partly upon the surface drainage. If this is good, the rain rapidly runs off into streams and only a small part of it penetrates the earth. On the other hand if the surface drainage is poor, the rain water soaks into the soil and percolates downward through it.

In either case the ability of the water to reach the coal seam depends upon the rock between the surface and the seam. If there intervenes between the coal bed and the surface a layer of rock more or less impervious, such as clay and shale, and if this is unbroken, the water will collect above this impervious layer and will not reach the coal bed. Such is the case in the great Franco-Belgian coal basin where shafts sunk to the coal beds penetrate water-bearing strata and have to be made water-tight to protect the mines. It is also true in the longwall district of Illinois where shafts sunk to the coal pass through water-bearing strata, though it is possible to shut a large part of this water out of the mines by making the shafts water-tight.

Where the beds are tilted so that there is an outcrop from which the beds slope downward, there is an excellent opportunity for rain or stream water flowing over the exposed edge of the bed to penetrate and, flowing downward, to saturate it. If such a bed is tapped below the outcrop, this water will flow into the mine and must be pumped out. When such water-bearing beds are overlaid by impervious layers it is possible, by drilling holes in them, to tap the water; and if the outcrop is at a higher level than the surface where the well is drilled, a flowing or artesian well will be obtained.

One of the best illustrations of the penetration of water into upturned strata is found in the anthracite districts of Pennsylvania where the edges of the strata are exposed to rainfall and to stream water, and where the amount of water pumped is large. This adds greatly to the cost of mining. In the case of one colliery during a month of low production, from 32 to 35 tons of water were pumped per ton of coal shipped. This, of course, is unusual and more than double the average amount of water handled, but it illustrates the expense involved in the drainage of mines so situated that the amount of water pumped is large.

There are some cases in which water enters the mine from below. These are similar to the last mentioned case, in which water is found between impermeable strata, the upper impervious layer in this case being below the coal bed. This occurs in the longwall district of Illinois where there are outbreaks of water through the fireclay underlying the coal. This water is quite high in mineral content, especially magnesia and sulphur. When a break in the fireclay has once occurred it has been found impossible to stop the flow and the only thing that can be done to prevent the softening and heaving of the fireclay bottom and the crumbling of the pack walls is to pipe out the water. The effect of the water is so great that an entry may close in two days after being wet. The promptness with which action is taken in case of an outbreak of this kind is shown by the fact that at one mine pipe was ordered from Chicago at 9 o'clock on Friday morning and 4,500 ft. of 6-in. pipe had been laid by Sunday.

Impurity Increases the Expense of Handling

If the water were pure, the expense caused by it would be that due to its effect on the rock or clay of the mine and the mechanical expense of pumping. While it is true that pure water corrodes boilers somewhat, its effect when handled at low temperatures, as is the case when pumping from the mine, is negligible. But mine water is impure and the substances dissolved in it sometimes add greatly to the trouble and expense of handling it.

The water in its passage through the soil absorbs more or less of the soluble substances with which it comes in contact. If the surface is covered with vegetation, the water takes up certain vegetable extracts; but these commonly disappear within a short depth because of reactions with other substances encountered. Carbon dioxide is dissolved from the air and from decaying vegetation. Any soluble substances in the rock itself are dissolved to an extent depending upon the amount of water, the time of contact with surface exposed and the solubility of the substances. Sodium chloride, or common salt, is readily dissolved and magnesium chloride even more readily; calcium sulphate is slightly soluble

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and magnesium sulphate is readily soluble; silica is only slightly soluble. These constituents and others are frequently found in mine water.

Calcium carbonate and magnesium carbonate are only slightly soluble in pure water, but in the presence of carbon dioxide they are converted into bicarbonates that are quite soluble. A typical reaction is as follows:

$$CaCO_3 + H_2O + CO_2 = CaH_2CO_3 \quad (1)$$

Ferrous (iron) carbonate behaves in the same way. These substances constitute the temporary hardness of water, as the bicarbonates are broken down by heat with the evolution of carbon dioxide (CO_2) and precipitation of the carbonates.

The most troublesome compounds found in mine waters are those resulting from the decomposition of iron disulphide, FeS_2. Nearly all coals and the adjacent strata contain this substance in the form of pyrite or marcasite. These two substances have the same chemical composition but differ in crystallization. Their chemical behavior is identical, though marcasite is more readily weathered than pyrite. In the presence of air and moisture, FeS_2 reacts to form sulphuric acid and ferrous sulphate. While this reaction is probably not always the same and may depend upon the temperature, the amount of oxygen present and the other substances dissolved, it may be illustrated as follows:

$$FeS_2 + 7O + H_2O = FeSO_4 + H_2SO_4 \quad (2)$$

Both the ferrous sulphate and the sulphuric acid are readily soluble and if no further changes took place, would be carried along by the water. Sulphuric acid is highly corrosive and causes great damage to pipes and pumps. The ferrous sulphate attacks brass and causes considerable damage when this metal is exposed to it. This mixture of ferrous sulphate and sulphuric acid is affected by oxygen in a way that may be illustrated as follows:

$$2FeSO_4 + H_2SO_4 + O = Fe_2(SO_4)_3 + H_2O \quad (3)$$

according to which one-half of the free acid is combined to produce ferric sulphate. It is this substance that causes the reddish-brown color of some mine waters.

It is probable that the reactions that actually take place are not so simple as the foregoing, and it is impossible to say what actually does take place in any particular case. The presence of carbonates of soda, calcium and magnesia would affect the results, as these would combine with the sulphuric acid and be converted to sulphates. In the presence of more than enough alkali to neutralize the substances, the ferrous sulphate would be decomposed and the iron would be precipitated as hydrate.

Even in the absence of these substances it cannot be assumed that the reaction of the ferrous sulphate to form the ferric is as simple as that outlined, because a part at least of the ferric sulphate may be precipitated as an insoluble basic sulphate—that is, one containing Fe, SO_4 and OH. There are other possible reactions such as:

$$6FeSO_4 + 3H_2O + 3O = 2Fe_2(OH)_6 \quad (4)$$

$$Fe_2(OH)_6 + 3H_2SO_4 = Fe_2(SO_4)_3 + 6H_2O \quad (5)$$

Also the iron sulphide itself is attacked by sulphuric acid:

$$FeS_2 + H_2SO_4 = FeSO_4 + H_2S + S \quad (6)$$

It is thus apparent that mine water may contain varying amounts of ferrous sulphate, ferric sulphate and sulphuric acid and that there will be precipitated from it a ferric hydrate, or varying basic sulphates that are much like the hydrates in appearance. Ferric sulphate attacks iron,

$$Fe_2(SO_4)_3 + Fe = 3FeSO_4 \quad (7)$$

forming ferrous sulphate. This action is quite vigorous if the solution is hot.

The amount of free sulphuric acid in the mine water depends upon the purity of the water that acts upon the FeS_2, and upon the extent to which the resulting ferrous sulphate is oxidized. As shown in reaction (2), water containing oxygen produces SO_4, half of which appears as ferrous sulphate and half as free sulphuric acid. In the presence of sufficient oxygen half of the free acid combines to form ferric sulphate, as shown in reaction (3). The relative amounts of ferrous and ferric sulphates evidently depend then upon the extent to which the ferrous sulphate is oxidized.

It must be understood that the reactions taking place in nature may not be so simple as those given as illustrations. It is known that ferrous sulphate and sulphuric acid are formed from pyrite, oxygen and water, and the simple reactions show what may occur. But the water that acts on pyrite is not pure and the pyrite itself is associated with other substances so that many side reactions may take place, and we have no means of knowing except in a general way what has occurred in any particular instance.

A CONCRETE DITCH OR SLUICE WHICH SHOWS THE EFFECT OF ACID WATER

In most cases the larger part of the iron sulphate has been oxidized to the ferric form and a corresponding amount of free acid has disappeared. In the absence of any reacting substances except pyrite, oxygen and water we may find in the form of free sulphuric acid from one-fourth to one-half of the sulphur of the pyrite. The iron sulphates are decomposed at boiler temperatures, so that the acid combined with iron is practically as harmful in a boiler as that which exists in the water in a free state. This is true also of aluminum sulphate.

If the water contains alkalies or comes in contact with limestone these react with the free acid and with the iron

and aluminum sulphates, and the water is partly or wholly neutralized.

$$H_2SO_4 + CaCO_3 = CaSO_4 + H_2O + CO_2 \quad (8)$$

$$H_2SO_4 + CaH_2(CO_3)_2 = CaSO_4 + 2H_2O + 2CO_2 \quad (9)$$

$$Fe_2(SO_4)_3 + 3CaCO_3 + 3H_2O = 2Fe(OH)_3 + 3CaSO_4 + 3CO_2 \quad (10)$$

Thus it is possible for part or all of the acid to disappear from its active forms and become bound with calcium as calcium sulphate. If all the SO_4 unites with calcium, the acid properties of the water will disappear and it will not be corrosive, but hard.

Acidity or alkalinity is determined by the use of indicators, substances whose colors are different in the presence of acids and alkalies. The most familiar of these is litmus, a vegetable coloring matter that is red in acid solutions and blue in alkaline solutions. This substance cannot be said to have a distinct neutral color, as red and blue litmus papers largely retain their colors in neutral solutions. Some indicators pass through a color change that indicates neutrality. Methyl red is yellow in alkaline solutions, has a brownish tinge in

LOWER END OF CEMENT-LINED DITCH ATTACKED BY MINE WATER

neutral solutions and is pink in acid solutions. It shows free sulphuric acid and sulphates of iron and aluminum.

Methyl orange is commonly used for estimating acidity. It shows free sulphuric acid only. Phenolphthalein shows free sulphuric acid, sulphates of iron and aluminum and free carbonic acid. If the water is acid, no carbonates or bicarbonates can be present, though some CO_2 resulting from their reaction with sulphuric acid or sulphates may remain. If the CO_2 is removed by boiling, the sulphuric acid, free and combined with iron and aluminum, will be shown.

From the results obtained with methyl orange and phenolphthalein it is possible to determine how much acid is free and how much combined. However, CO_2 is not readily driven out completely and for delicate work it is best to evaporate the water to dryness and dissolve the residue in distilled water. It is commonly assumed, however, that the CO_2 has been driven off when boiling temperature is reached, and most analyses are performed in this way.

The following analyses are given for the purpose of showing what may be found in mine waters. They illustrate also the great differences in character that accompany different conditions. Sample No. 1 is from a mine in southern Illinois.

	Grains per Gal.
Calcium carbonate ($CaCO_3$)	7.25
Calcium sulphate ($CaSO_4$)	18.34
Magnesium carbonate ($MgCO_3$)	5.29
Sodium sulphate (Na_2SO_4)	40.11
Sodium chloride (NaCl)	201.48
Sodium carbonate (Na_2CO_3)	10.44

It is evident that this is an alkaline saline water and that it does not contain the immediate products of the oxidation of pyrite. In fact, it is not a "mine water" in the sense in which this expression is often used, meaning a water charged with products of pyrite oxidation. It is a natural saline alkaline water that has found its way into a mine. Some of the sulphates, however, may have been formed by the reaction of sulphuric acid with the alkalies of the water. This water is treated and used in boilers.

Sample No. 2 is from western Pennsylvania. It is from a low sulphur region, but from an old mine with large underground drainage so that there is abundant opportunity for the oxidation of pyrite. The average amount pumped is about 4,000,000 gal. per day.

	Grains per Gal.
Silica (SiO_2)	3.71
Ferrous iron	0.36
Ferric iron	18.65
Aluminum	6.48
Calcium	17.19
Magnesium	4.61
Sodium	1.23
Potassium	0.10
Total sulphate (SO_4)	161.16
Free sulphuric acid (H_2SO_4)	16.15

It is apparent that nearly all the iron has been changed to the ferric condition, showing that there has been opportunity for almost complete oxidation in which a considerable part of the free acid has been combined (reaction 3). Probably calcium and magnesium sulphates have also been formed from the carbonates. The free acid carried out in this water in 24 hours amounts to about 4.6 tons.

Another mine in the same district gave water of the following composition:

	Grains per Gal.
Sodium chloride (NaCl)	2.59
Sodium sulphate (Na_2SO_4)	10.34
Calcium sulphate ($CaSO_4$)	32.05
Magnesium sulphate ($MgSO_4$)	22.09
Silica (SiO_2)	2.33
Iron and aluminum (Fe_2O_3 and Al_2O_3)	51.54
Iron (FeO)	16.50
Sulphates (SO_3)	93.44
Free sulphuric acid (H_2SO_4)	213.50

This is an extremely acidulous water and is discharged in great quantities so that the amount of sulphuric acid carried by it is large.

Two waters from anthracite districts gave the following analyses:

	Appearance — Yellow	Black*
	Grains per Gal.	
Oxides of iron and aluminum (Fe_2O_3 and Al_2O_3)	486	280
Lime (CaO)	195	176
Magnesia (MgO)	202	140
Free acidity (calculated as sulphuric acid, H_2SO_4)	152	118
Total acidity (calculated as sulphuric acid, H_2SO_4)	1,097	343
Total sulphuric acid (SO_3)	1,410	754
Total solids in solution	2,963	1,402

*Black color due to coal dust.

The free acidity was found by titration with methyl orange, the total acidity by titration with phenolphthalein. The total sulphuric acid (SO_3) includes that in free acid and decomposable salts, and also that combined in neutral salts, such as sodium, calcium and magnesium sulphates.

These analyses, with the exception of that of alkaline water from southern Illinois, show large quantities of sulphuric acid and decomposable salts of that acid. The

sulphates of iron and aluminum have little effect on iron while the water is cold, but they are corrosive if introduced into a boiler as they are decomposed and the acid is set free to attack the metal while the iron and aluminum are precipitated as hydrates. This precipitation does not take place in water containing much free acid, but readily occurs in that containing little or no free acid.

The free sulphuric acid readily attacks iron and it is this that necessitates the use of wood-lined or bronze pumps and wood pipe. That mine water will affect cement is shown by the accompanying illustrations, which show part of a ditch used to carry mine water and prevent the contamination of a stream used for boiler supply. The lower end of the ditch is lined with cement and the picture shows that this has been somewhat attacked.

In some cases it becomes desirable to remove from the water the corrosive substances that it carries and which, as we have seen, are free sulphuric acid and sulphates of iron and aluminum. The free sulphuric acid can most readily be removed by neutralization with an alkali. The three common commercial alkalies that are cheap enough to be considered are soda ash (crude sodium carbonate), lime and limestone. Of these soda ash acts most rapidly because it is readily soluble. The substances formed by its reaction with sulphuric acid are sodium sulphate and carbon dioxide. Though cheap this reagent is too expensive to be used in large quantities.

Lime Being Less Soluble Acts Slower Than Soda Ash

Lime acts more slowly than soda ash because it is much less soluble, but as it becomes finely divided as soon as it is slacked, a large surface is presented and its action is sufficiently rapid for use in some cases; calcium sulphate is formed by the reaction. Lime is quite largely used in the treatment of water for boiler purposes and sometimes in the purification of water for domestic use. When the water is to be used for boiler feeding it is necessary as far as possible to remove the calcium sulphate formed by the use of soda ash, which precipitates the calcium as a carbonate.

The cheapest of the three alkalies mentioned is limestone, but its action is slow unless it is finely pulverized. It is this substance that is responsible for most of the natural neutralization of acid waters. In order that its action may be effective it is necessary that the deposit of iron compounds on the surface of the stone be removed, otherwise the underlying limestone will be so protected from the action of the water that neutralization will proceed but slowly. It is this fact that makes it impractical to neutralize a highly polluted water by merely allowing it to flow over limestone; calcium sulphate is formed, as when lime is employed.

The sulphates of iron and aluminum can be removed by the same means that prove effective in the case of free acid. Ferrous sulphate, iron and aluminum can be precipitated as hydrates, or basic sulphates of uncertain composition. The exact form of the precipitate probably depends principally upon the composition of the water, the concentration, the amount of alkali used and the temperature.

The neutralization of water is at present an uncompensated expense, but it is worth while to see what possibilities exist for obtaining substances of commercial value. We have seen that the corrosive substances in the mine water are principally free sulphuric acid and sulphates of iron and aluminum. Sulphuric acid is one of the most widely used chemicals and has so many applications that its market is stable. The only practical way to get it out of the water, however, involves the formation of substances that have little commercial value and from which the sulphuric acid cannot be recovered economically.

In the case of the sulphates of iron and aluminum it is different. When the free acid is neutralized, the iron and aluminum sulphates are precipitated as basic sulphates, the composition of which in any particular case it is impossible to give. It is known that they contain the metal, OH and SO_4. By drying and calcining this precipitate the sulphuric acid can be driven off and recovered. Sulphuric acid is so cheap that this process would not be commercially profitable, but the value of the acid obtained would partly or wholly defray the cost of treatment and might make it possible to purify water that otherwise could not be treated.

The other substances to be considered are the sulphates of iron and aluminum. Commonly, the aluminum is much less in amount than the iron and while aluminum sulphate has a value it could not be separated from the iron without prohibitive expense. The iron has two known uses and it is possible that others may be developed. In the first place ferric hydrate, properly prepared, is used to remove H_2S from manufactured gas. The precipitate obtained by neutralizing mine water ought to be useful for this purpose. The substances now most employed for the process in this country are natural iron oxides made from certain ores and artificial iron oxides, which are made by rusting iron borings and turnings. Some purifier imported from Europe has been made by a process of precipitation from solution. Many hundreds of tons are used in this country annually. Good oxide is worth from $6 to $8 per ton.

Precipitated Iron Might Be Used as a Pigment

The other use it seems possible to make of this precipitated iron is that of pigment. Immense quantities of iron oxides are used as pigments for various purposes. Some of this is natural and some artificial. Its value depends upon its color and freedom from impurities. The highest priced of all these oxides is rouge. This is used for polishing powder because of its freedom from foreign substances or hard particles that would cause scratching.

The precipitate of basic iron sulphates can be calcined and the substance left after driving off the sulphuric acid from water will be ferric oxide. Its purity of course will depend upon the method of precipitation, which will largely govern the amount of calcium sulphate contained in the precipitate. The color produced depends upon the purity and the method of calcination. There seems to be no reason why it should not be possible to produce in this way a desirable pigment.

The field of chemistry in the treatment of mine water has heretofore been studied almost entirely from one viewpoint, that of prevention of damage to pipes, pumps and boilers. It seems probable however that it will be found worth while to investigate it with the view of discovering the least expensive methods of removing the undesirable substances and of learning what valuable products can be produced.

Recollections of a Manager

Once a month all the company's superintendents gathered at my office to compare notes and to give and receive suggestions. At these meetings almost invariably one of the superintendents had some remark to make about trouble experienced in getting competent men to fill vacancies, and between us we finally came to the conclusion that it was up to us to devise a plan that would inspire our men to educate themselves for advancement.

I have always been able to pick up suggestions from a study of statistics, so I had my secretary prepare a list showing promotions that had been made from the ranks in each of our camps during the two preceding years. A little study of the statement revealed the fact that a promotion from the ranks in any camp was generally followed by one or two more, and I took that to indicate that the first man by his example suggested the possibilities to the ones who later on followed in his footsteps. That being true, the problem of getting men to make the most of their opportunities seemed to be largely a matter of inspiring them by example.

At the next superintendents' meeting, I passed around the list that my secretary had prepared and mentioned the conclusion that I had drawn from it; the superintendents almost to a man voiced their agreement with my views. Not only that, but most of them recalled instances in their own experiences that argued for the correctness of the conclusion, and they took delight in relating them. Truth is, the meeting developed into a sort of experience meeting in which each one present had something to say.

So far so good; but how were we to profit by our discovery?

A marked copy of a weekly paper that happened to lie on my desk, containing an account of a mine foreman's promotion at one of our mines, gave us the suggestion that was finally adopted. We decided to issue an employees' weekly in which promotions and success stories actually gathered in our different camps should be featured. Every time a man in the company's employ gained a promotion by overcoming obstacles, the men in seven mining camps would learn all the particulars and be inspired by the feat—as matters stood, only the men in one camp took notice.

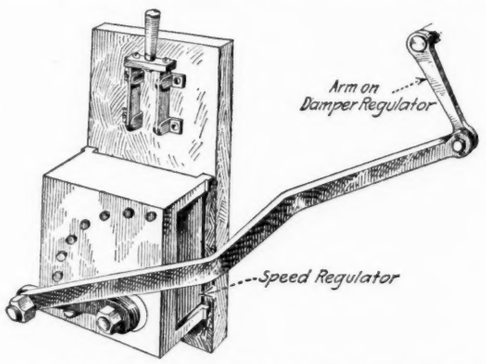
After a little discussion of the possibilities every one became enthusiastic, and we decided to lose no time in launching the paper. In fact we made life miserable for the publisher who printed the first issue, because he could not get it out fast enough to cope with our impatience.

Five issues, however, used up all the success stories that could be told in the past tense about our men, and by the time copy was in the printer's hands for the seventh issue all the editors—myself included—were in despair; it seemed as if things were happening at the rate of half a column each week while we required twelve as a minimum.

Finally, we decided to announce in the eighth number that the paper would be discontinued with the current issue. At the last minute we found that we had nothing to put on the last page of that issue, but there was no help for it. Imagine our surprise then, to find when the paper came from the press, this maxim printed in large letters across the page—" 'Tis not in mortals to command success." Our publisher had come to our assistance.

Motor-Operated Stoker

Stoker engines are usually not well attended and are so located that the dust and oil mingle in a sticky mass which makes the engine hard to clean, says F. F. Sengstock in *Power*. Our chief has substituted a motor drive



DAMPER REGULATOR OPERATED SPEED CONTROL

located outside of the boiler-room wall and driving a shaft in turn belted to the chain-grate countershaft. The speed regulator is connected to an arm of the damper regulator by a rod, as shown in the illustration. This operates the grates more satisfactorily than the steam engine and requires but little attention.

Byproduct Coke Producers' Meet at Detroit

The Byproduct Coke Producers' Association of America met at the Detroit Athletic Club's palatial headquarters, Detroit, Mich., on Oct. 20 and 21, as the guests of the Semet-Solvay Co. This meeting constituted the third quarterly session of the association, which was first formed at Chicago in January of the present year, the second meeting having been held in July at Boston.

The main business of the association at the meeting was to hear the report of a standardization committee that had been appointed to formulate a scale of sizes for domestic byproduct coke. This matter took up much of the time at the two sittings on the mornings of both days occupied by the session.

The persons present at the meeting were most completely representative of the byproduct industry, both from a producing and marketing point of view, those participating including:

J. D. Forrest, of Indianapolis, Ind., president; W. H. Ball, Syracuse, N. Y., vice-president; W. J. Lavelle, Boston, Mass., secretary-treasurer; C. D. Caldwell, of Chicago, Ill.; N. Anderson, of New York; J. A. Curtis, of Detroit, Mich.; Paul N. Bogart, of Terre Haute, Ind.; F. W. Miller, of Cincinnati, Ohio; Paul Roberts, of Detroit, Mich.; J. L. Mackenson, of Chicago, Ill.; Charles C. Marvel, of Syracuse, N. Y.; George E. Crosby, Jr., of Cincinnati, Ohio; F. C. Atwill, of Chicago, Ill.; Parker H. Woods, of St. Louis, Mo.; J. A. Ballard, of Detroit, Mich.; J. A. Galligan, of Chicago, Ill.; H. L. Nickerson, of Boston, Mass.; C. N. Turner, of Milwaukee, Wis.; J. C. Layne, Jr., of Cincinnati, Ohio; Carroll Miller, of Aurora, Ill.; S. Weiss, of Detroit, Mich.; C. H. Jenkins, of Chicago, Ill., and T. V. Salt, of McKeesport, Penn.

The guests were royally treated by their Detroit hosts, a banquet with speech making being given on Friday, Oct. 20. It is expected that in accord with the expressed approval of the meeting the next session will be held in Milwaukee, Wis. The date is not settled, but in accord with the bylaws it must take place early in January.

Safety in Coke-Oven Operations*

By K. M. Burr†

SYNOPSIS—The writer shows that at a plant where the safeguards are more than ordinarily complete the accidents in what he terms hand labor comprise 35 per cent. of the whole casualty rate. He therefore advocates permanent employment, education and selection of workmen. He outlines some of the safeguards peculiar to his plant.

The United States Bureau of Mines has issued a report on the coke-oven accidents in the United States during the year 1915. The figures for the byproduct ovens are based on information from 38 different plants. For the year 1915 it shows that—of the total number of men employed—almost 17 per cent. were injured and even speaks of that discreditable record as being a gratifying decrease from the record of the years 1913 and 1914.

I know that many plants will be anxious to have it known that their rates are much lower. At our coke plant at Gary the accident rate is about one-third that of the industry as a whole, and we feel that even that rate is too high and we are trying hard to reduce it.

The liability to injury at coke plants is not great. Outside of the shops there is comparatively little moving machinery connected with coke-oven operations. This may be the reason why at some plants they think when they have installed the usual mechanical safeguards they have done all that is required of them. Apparently the managements conclude that, as coke making is essentially a hand-labor operation, the safety of the workman depends entirely on himself. Thus limiting the field of their efforts the managers have not done all that could be done to prevent accidents.

In order to supply some of the much-needed data on the causes of byproduct-plant injuries, I have made an analysis of the records of our own plant, which employs between eight and nine hundred men and has a byproduct department in which benzol is recovered. This analysis gives the percentage of causes as follows:

CAUSATION OF ACCIDENTS AT BYPRODUCTS PLANT OF ILLINOIS STEEL CO.

Hand Labor	
About the ovens	17.47
About the shops	7.23
About the coal-handling department	4.82
About the byproduct department	3.61
About the coke-handling department	2.41
	35.54
Burns	
Steam and hot water	7.83
About charging holes	4.21
Electricity	2.41
Hot tar, lime, etc.	1.80
Stand pipes and dampers	1.80
Acid	1.80
About doors of ovens	1.20
	21.05
Railroad	
About engines or cars	2.41
Falls	
Slipping or tripping on the ground level	7.83
Slipping or tripping above ground	6.02
From ladders, scaffolds, etc.	2.41
Into unprotected holes	0.60
	16.86
Particles in the Eye	
From wind	11.44
From tools or work	0.60
	12.04
Machinery	
About batteries	3.01
About byproducts department	2.41
About shops	1.21
	6.63
Falling material	0.60
Miscellaneous	4.82

Thus hand-labor accidents head the list. All authorities agree that these are virtually all due to carelessness. A large percentage of injuries were burns of one kind or another. Of course this is to be expected.

Investigation showed, however that practically every injury due to burns would have been prevented had a proper amount of care been used. In fact, with the exception of the injuries to eyes due to flying particles, I was convinced that at least 90 per cent. of the accidents were due to lack of care on the part of the injured workmen or to careless acts of others. In this connection it is proper to state that our plant has been very active in its efforts to make conditions as safe as possible. I hope it will be understood that this statement is not made in a spirit of self-praise nor of criticism of other plants. It is made only as a possible explanation of the fact that the statement of causes shows such a low percentage of accidents due to machinery.

Some Interesting Provisions for Safety

At the risk of seeming to give more importance to the matter of mechanical safeguarding than its relative importance merits, it may be well to mention a few of the provisions for safety at this plant. At the coal-unloading station derails are used to prevent the bumping of cars on which unloading crews are working. As it is necessary for men at times to poke down the coal in the cars, steel platforms are provided at the sides of the tracks from which much of this work can be done. These furnish a safe and easy way by which men may be enabled to get onto and into cars. Cables are stretched across the hoppers. As the cables are not rigid, they allow the coal to pass through readily and at the same time accomplish their purpose of preventing men from falling into these fuel pockets.

Wrenches for use in opening the doors of the hopper cars are so made that when the ratchet dog is released and the pressure of coal upon the doors causes the shaft to spin, the wrench automatically releases. Open lights are not allowed in the crusher buildings or in the coal-conveyor inclosures. Provision is made by which the snapping of an electric switch at any of a number of convenient places will at once stop the conveyor.

On the ovens the larry cars are equipped with fenders and automatic bells. The operator's cab is located so that he always has an unobstructed view ahead. The chutes on the cars are so constructed that, when charging, a hinged extension swings into place. This reduces to a minimum the amount of coal spilled around the charging hole. The lidsmen wear leggings, use a long-handled hook for removing lids, a long-handled broom for sweeping spilled coal into the ovens and they are of course instructed to work always on the windward side of the charging hole.

The walks on both the pusher and coke sides of the ovens are wide. The coke is not quenched at the ovens but is taken in transfer cars to a quenching station so inclosed that the steam generated is carried upward, thus reducing the number of accidents that are due to steam-obstructed vision.

These are but a few of the mechanical safeguards. Stairways, walks, railings, gear-guards and other usual safety provisions are, of course, also provided.

*Address delivered before the National Safety Council, Iron and Steel Sectional Meeting, Friday, Oct. 20, at Detroit, Mich.

†Safety inspector, Illinois Steel Co., Gary, Ind.

As it is shown that coke-oven accidents are not due to lack of physical protection, the conclusion is obvious that men employed in coke-oven operations must be very careless or they would not have so many accidents. This carelessness must result either from the character of the men which labor conditions compel us to employ or from the fact that the laborers lack proper education in the art of providing for this safety.

Now it is true that the work about the ovens is mostly of a routine nature. It does not require any special training or skill; therefore there is a large percentage of unskilled labor employed. At the same time the work is dirty and, about the ovens, it is hot and unpleasant especially in the summer months. Largely as a result of these conditions the percentage of changes in the operating force is high. Accident rates in industry are always high whenever and wherever there is a large percentage of newly employed men. Safety in coke-oven operations must accordingly begin with the employment of the men. The duty of the foremen in this regard cannot be too strongly stated, and moreover, care in the selection of men can be made a great factor in assuring the permanence of the working force.

Of course the plants should be made safe as far as mechanical safeguards and safe working conditions will assure such safety. At the same time it is impossible to give too much attention to working conditions that affect the welfare and comfort of the men. As a suggestion along these lines I would call attention to the excessive heat on the top of the ovens. It comes largely from the stand pipes. I believe that it would be well to insulate them so that the amount of heat radiated would be reduced to a minimum. Water closets, urinals, wash and locker rooms and shower baths should be provided. They should be convenient, light and well ventilated and above all should be kept clean. The mere providing of sanitary equipment is not sufficient; it should always be maintained in a manner to make it attractive and inviting. In short one of the best ways to assure a permanent force is to make conditions as comfortable and attractive as possible.

How Safety Committees Inculcate Safety

Above all things every effort should be exerted to educate the workman into habits of caution. It is indispensable that every workman should be carefully instructed by his foreman regarding his work and the dangers attached to it. It is particularly necessary that the foreman should give complete instructions in safety to the non-English speaking workmen and that he should take pains to assure himself that the men fully understand and appreciate what they have been told. He should insist that each man under him do his work as he has been instructed to do it. He should be held responsible for every accident that occurs to his men and should thoroughly understand that he will be called upon to explain all such accidents. An effective means of education is that afforded by safety committees. But though such organizations are active the foreman should never be permitted to forget his personal responsibility.

The most important function of the safety committee is to spread the gospel of safety, to impress upon each man that he must be careful at all times, that he must think and act safety. I believe that the most good can be secured by meetings held with groups of workmen. There cannot be too many of these meetings. It is highly important that written reports be made of each meeting, as from these records much information may be obtained which is of value to others. Most important, however, is the psychological effect on the man making the report. He is naturally anxious to state something of interest and to show that he is doing good work. This almost inevitably results in his noticing dangers which he would probably overlook if he were not given the responsibility of reporting as to the safety of the plant.

The committeemen must be impressed with the frankness and sincerity of the management. The keynote of safety committee work must be "enthusiasm." No man can be enthusiastic in any work unless he believes it is right. There must be no doubt of it in his mind. Committees should work with the spirit of coöperation. Each member should be made to feel that he must plan and work for the prevention of accidents because it is right for him to be his "brother's keeper," and not because he expects any reward other than the satisfaction given by the doing well of a good work. Nevertheless he must be made to feel that the eyes of his operating superiors are on him and that his efficiency in getting safety results will please his boss.

Coöperation of Head of Plant Essential

As to the attitude of the operating head of the plant it is absolutely necessary that he put all the power of his position and all the force of his personality behind the demand for accident prevention. If he is inclined to delegate safety work to others and is not willing to take an active personal interest in it, the results are sure to be disappointing. A safety-first movement without the push of the superintendent continually behind it is like a watch without a mainspring.

We have a good safety committee in our coke-oven department, which, as it is a big organization, has a large number of foremen. There is a general safety committee which meets once a week. It is a sort of ways and means committee. It held 59 meetings during the first nine months of this year. The day following the meetings of this committee there is a meeting of what is called the Booster Committee. This committee consists of foremen. They discuss conditions, especially considering the matters to which their attention has been called by the general committee. They decide what shall be talked about in the meetings with the workmen. Each booster—during the week—gets together the members of his group. The groups consist of from 5 to 10 workmen who are selected because of their ability to talk to the men. Each booster instructs the members of his group and these in turn hold meetings with the other workmen. This is a sort of an endless-chain scheme and works most successfully. There were 2,696 of these meetings, of which written reports were made, during the first nine months of this year.

Education in safety naturally begins with telling men of things to be avoided—with instructions as to the safe way of working. But there is a broader field for this work. It is the duty of those who, either by endowment of nature or through better opportunities of education or training, have superior reasoning powers to teach those less fortunate to think for themselves, to induce them to exercise their own powers of observation and to encourage them to develop and use their own reasoning powers.

Standard Plugs

A contribution to the discussion of the Mining Electrical Engineers of the West of Scotland, on the Standardization of Switchgear, was submitted in the form of a letter by W. A. Logan, of the Diamond Coal Cutter Co., of Wakefield. He said: "By the standardizing of trailing-cable plugs a difficulty would be removed while inconvenience and loss of time would be saved. At present it is customary at a colliery to have a trailing cable for each type of machine, but one or two cables would meet the case if a standard plug were adopted. From the point of view of the makers, however, there are difficulties in the way.

"Where a colliery has a few machines all of one type, and a new one is supplied with the standard plug, it means that either all the machines and gate-end boxes must be altered or a spare cable kept for the new machine. I do not think it is good practice, especially with a cab-type cable, to have two different plugs fitted to it, as it means the cable cannot be changed end for end.

"Another point is that makers would have to standardize the actual locking pin of the plug, even though the mechanism for actuating the same was different. As makers of motor cars design their engines to have standard ignition plugs, it seems quite reasonable that the same could be applied to the trailing-cable plugs of coal cutters and gate-end boxes."

Wastefulness in Great Britain

Sir William Garforth's remarks at the opening of the sixty-fourth general meeting of the Institution of Mining Engineers of Great Britain, show that the coal industry and the coal-using industries of the British Isles are almost as prodigal as those of the United States in the waste of coal.

He stated that though the distillates of coal were essential to many industries, only about 20 per cent. of the output of Great Britain was at present carbonized. The whole of the tar, ammonia and benzol contained in the remaining 80 per cent. was therefore lost. The time has now arrived when coal should no longe[illegible]regarded as a fuel.

While 20 per cent. of the whole British coal output is carbonized, Sir William Garforth stated that 5,000,000 tons a year of this output is coked in beehive ovens with a total loss of byproducts. This quantity alone represents a loss to the nation of 70,000 tons of ammonium sulphate, 250,000 tons of tar and 12,000,000 to 15,000,000 gal. of benzol, all of which could be saved if the coal were distilled in byproduct ovens.

But even when the coal is thus carbonized much fuel value is still wasted, for of 7,000 million cubic feet of gas available annually only a small portion is being utilized, whereas by arranging for the supply of gas to neighboring collieries, steel works and power companies these heat values might be saved.

There is also a heavy waste in the mineral underground. Pillars of coal are left between estates and for the support of reservoirs and railroads, and often the coal loss is of greater importance than the loss that would be entailed to property by the extraction of the mineral. It is to be hoped that the Government of Great Britain will intervene to prevent such unnecessary losses in the deeper mines. The Advisory Council for Research should be able to provide for such coöperation of industrial forces that losses of the kind described might largely be eliminated.

New York Central Embargoes

The following embargoes are now in effect on bituminous and anthracite coal to local and New England points, as placed by the New York Central Railroad Co. (east of Buffalo) and its New England connections:

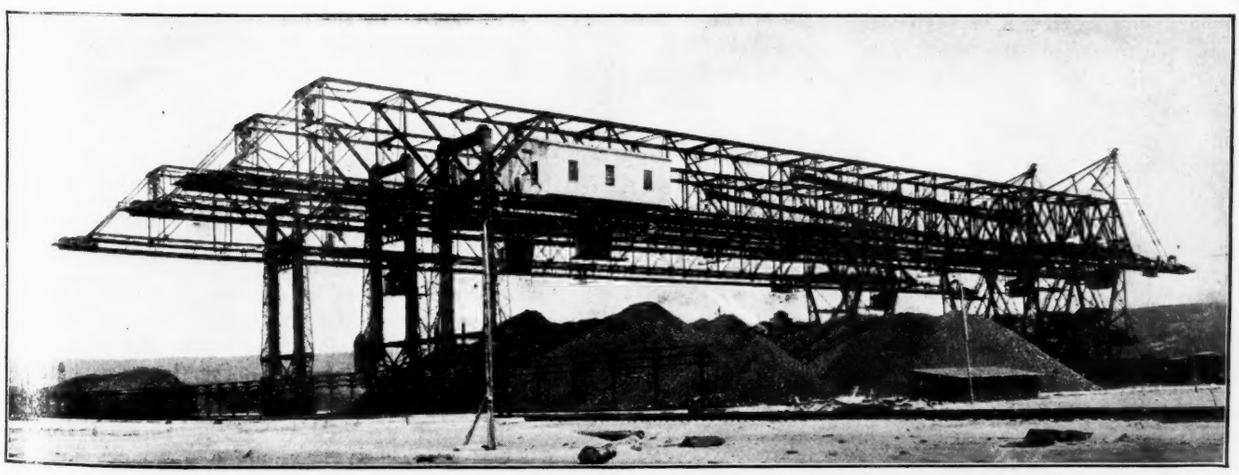
1. To points on or via the Boston & Maine R.R. via Schenectady, D. & H. Co., and Mechanicville, N. Y., except when for Boston & Maine R.R. supply.

2. To points on or via Boston & Maine R.R. when received from D. & H. Co. at Mechanicville, N. Y., except coal consigned to and for the use of the Boston & Maine R.R. and the United States Government.

3. To or for account of certain consignees on or via Boston & Maine R.R.

4. To or for account of certain consignees on or via New York, New Haven & Hartford R.R.

5. When sent for reconsignment to Mechanicville, N. Y.; Rensselaer, N. Y.; Rotterdam Junction, N. Y.; Syracuse, N. Y.; Troy, N. Y.; West Albany, N. Y., and West Albany Transfer, N. Y.



BERWIND FUEL CO.'S DOCKS, DULUTH, MINN. DAILY CAPACITY, 10,000 TONS

Difficulties of Organizing Sales Combines

By J. F. Kellock Brown*

SYNOPSIS—A discussion of the feasibility of organizing a central selling combine and some results in other countries where this scheme has been tried. The Transvaal organization has only been in operation at intermittent periods, but the German Westphalian has been in continuous operation for over 30 years.

In the competition recently arranged by *Coal Age* for the best suggestion for the improvement of the coal industry, one of the interesting features of the published replies was the indication given that a number of correspondents appeared to be groping round the idea of a general selling bureau, or some similar organization, designed to promote coal sales and eliminate competition. The idea is practical and has been practiced elsewhere with success, but it has to be remembered that its success depends entirely upon the intensity of the industry's troubles and upon a knowledge and an appreciation of the advantages that only experience can teach. In other words, it would require a severe upheaval of established customs before all coal operators could be brought together on such subjects as restriction of outputs and the clearness of vision and equity of outlook that would be essential.

To narrow the question, is the coal trade in such a hopeless condition that it would welcome a proposal which would probably limit outputs and then dictate to all operators where and to what extent they can sell coal and the price of the sale? Having at one time undertaken to operate against such an association, as a single lone operator, I may be able to give an idea as to what it actually means and implies.

The underlying idea of a combined organization is sound, but like many another sound proposal it can be misapplied. The basis of this system rests on the principle that disjointed and disorganized efforts should give way to controlled action, while overproduction should be eliminated and the factors that give rise to such conditions should forthwith be corrected. This is one of the main platforms of the Socialist and coöperation movements, and it has been the guiding principle in the evolution of the trust.

The chief difference between these greatly diverging bodies appears to be mainly in the distribution of the resultant savings. The Socialist believes that the balance should go to the governing power for the furtherance of national effort elsewhere; the coöperative enthusiasts believe in returning earnings in the form of dividends given to all participators in the movement, and the trust is much the same, but with a less equitable distribution. The first is supposed to be to the benefit of the people of the country as a whole, the second to a smaller proportion thereof, and the last to one or two men at the top of the tree.

*Mining engineer, Sydney, N. S.

It seems therefore that the establishment of any such bureau raises some large-sized questions that have not yet been seriously considered. The organized sale of coal implies some measure of price control, and the public might quite readily assume that a "trust" had been created. There are other interests upon which we are dependent for general prosperity that demand cheap coal in order to get along, and these interests are deserving of as much consideration as the coal industry.

Hence it will be necessary for the coal men to conciliate the coal-purchasing public and show them the necessity of this increase in price. This at once raises the question as to what the coal trade will consider a reasonable profit on operations. Obviously, it will not do to arrogantly assume the right to regulate the coal prices and arbitrarily raise them with the mere statement that it is necessary in order that the coal industry can live. It is only fair and just that the industry be prepared to make a frank statement of its costs and profits in order that the buyers may be satisfied there is no extortion. This looks like a difficult problem, but such associations have proved an economic success in other coal fields of the world. It is therefore of interest to know the conditions under which they began and are able to continue.

The Transvaal Coal Owners' Association

Differences exist between the methods employed, but the combines all appear to have developed from a long period of severe competition, excessive overproduction and low prices. In South Africa the conditions were overproduction in a limited internal market in which each operator was fighting desperately to hold his own. Round coal dropped below one dollar a ton, which is considerable in a country that mines perhaps only 50 per cent. of this grade of coal. The rest of the output—dross and "duff" waste—was unsalable and was dumped on the veldt. Apparently the struggle was to be continued until one or two of the stronger companies obtained a monopoly of the industry through the failure of the others. To avoid that, the suggestion was made that an association be formed to take over the marketing of the coal.

This combine handles an output of some five million tons and has succeeded in increasing the price to over a dollar per ton. This provides a reasonable profit and at the same time effects a saving in sales expenses and in delivery cost. In the beginning the total available market was estimated and a proportion allocated to each mine upon the basis of its production and past sales. Naturally, some mines had to put up with a reduction of output.

The combine was organized under the name of the Transvaal Coal Owners' Association and each of the mines interested subscribed for stock in proportion to its tonnage. The association became responsible for all coal sales, but did not take over any old contracts. These had been made at a low figure and were allowed to run out in due course. When the buyer wished to renew the contract it was referred to the combine, and since there was no competition it was able to obtain a higher figure.

The coal required was ordered from any colliery the association desired, provided of course that the fuel came up to the standard asked for. All the mines merely received orders to ship so much tonnage to certain consumers, and the association was billed with this tonnage at the prices fixed on. The combine is responsible for all collections. In the event of a colliery failing to deliver the required quantity, the association makes it up from some other source, and a frequent failing in this respect leads to a reduction in the quantity allotted to that company.

As the quality varied considerably, the coal was sold upon the basis of its calorific value, and the various mines were paid upon this basis. The expenses of the association were provided for by a small charge per ton of coal sold, and any profits made, as perhaps through a greater price than that offered the mines, was returned in the form of dividends on the stock.

These are the principal features of the Transvaal Association. It saved the coal trade for the time being at least, regulated the outputs to market conditions and effected economy in delivery by eliminating cross-freighting and a multiplicity of sales forces; and all this was accomplished without raising the price to such an extent that interference with other industries was threatened. At the same time the life of the Transvaal and Natal associations has averaged only about three years, breaking down in about that time and continuing out of existence until conditions called for the formation of another syndicate.

Comparison with the Westphalian Syndicate

The Westphalian Syndicate is a much larger combine, being composed of seventy to seventy-five collieries marketing together 50,000,000 tons a year. The association is purely a selling organization, having only a nominal capital and holding no property. Each company is represented on the board of the syndicate, and every half-year the tonnage is allotted to each mine, contracts commonly being made between the syndicate and the buyer over five-year periods. The mine is charged a commission on the sale of the coal. Penalties are exacted from the mines for loss from poor coal and from the syndicate for inability to sell. The point of greatest interest about the German organization is that it has existed for over thirty years without a break.

These associations were developed from sheer necessity to remedy an intolerable state of affairs. Competition was killing the industry and the distress was so evident, that the public raised no serious objections to the increase in price, on the principle presumably that the value of the industry to the country was greater than any hardship imposed by costly fuel. The reason why one country has had continued success with this plan and the other only intermittent success, is probably due to the national characteristics, both human and natural.

In Germany, where the people are more accustomed to industrial organization, they have not the same objections that we might have, were our activities controlled in any way; they have also found that it is in many ways better to receive a steady price for the coal, since these conditions enable them to easily finance ahead. If you were to be told at the end of every half-year just how much coal you could sell at a fixed price during the following six months, you would certainly consider that this had some very decided advantages. You would get rid of all guess work on the trend of the markets, and you could estimate all your capital requirements with great accuracy.

South Africa presents opposite features. There the individualistic idea is strongly developed. The country possesses some large operating companies, but the coal fields are in most districts easily mined. The seams are relatively thick, outcropping in many places, no large and complicated plants are needed, and relatively cheap native labor is utilized, so that a small mine can be started with a comparatively small investment.

All this creates a difficult situation for the coal owners' association. The large operators may be as ruthless as they please in trying to force out the small operators, but when the price of coal is rising this cannot be done. The Anglo-Saxon race demands freedom; it dislikes the thought of being oppressed by combines and associations, and so there are always buyers and operators doing their best to break up such syndicates, and if there are enough of them, the combine goes. In many ways these conditions exist in this country, only greatly magnified, owing to the multiplicity of the interests involved.

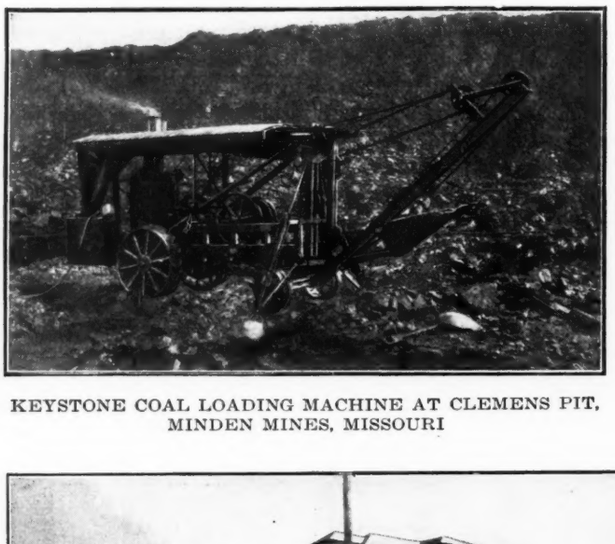
SAWMILL OPERATED BY NEW RIVER & POCAHONTAS CONSOLIDATED COAL CO., BERWIND, W. VA.

SHOWING BUCKETS ON AËRIAL TRAMWAY CARRYING REFUSE FROM WASHERY TO DUMP, BERWIND, W. VA.

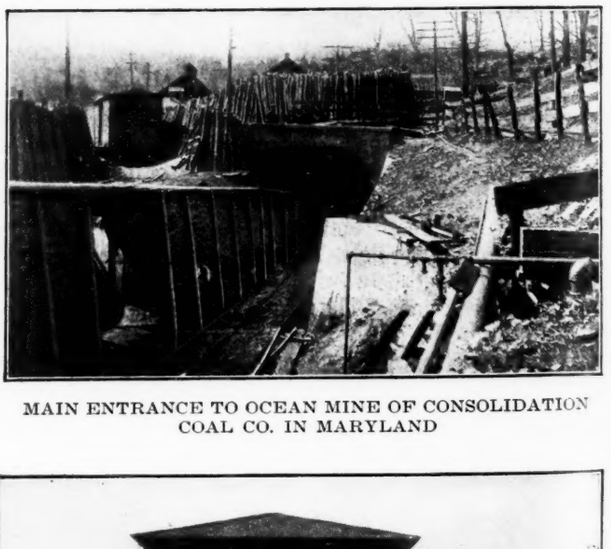
Snap-Shots in Coal Mining

KOOI COAL CO.'S BAND, KOOI, WYO.
The company and its employees are proud of their musical organization

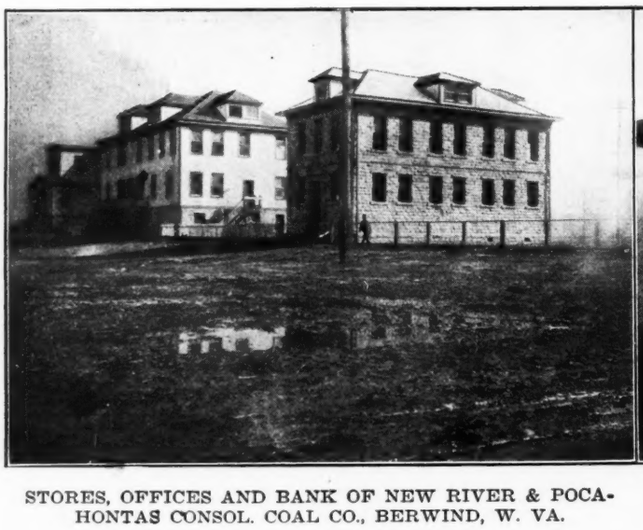
A 20-TON GOODMAN MACHINE
Largest mine locomotive in Wyoming. Doris Kooi, daughter of owner, in motorman's seat



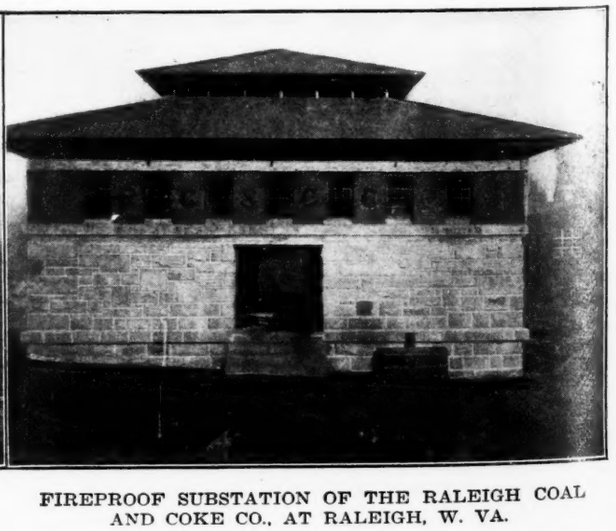
KEYSTONE COAL LOADING MACHINE AT CLEMENS PIT, MINDEN MINES, MISSOURI



MAIN ENTRANCE TO OCEAN MINE OF CONSOLIDATION COAL CO. IN MARYLAND



STORES, OFFICES AND BANK OF NEW RIVER & POCAHONTAS CONSOL. COAL CO., BERWIND, W. VA.



FIREPROOF SUBSTATION OF THE RALEIGH COAL AND COKE CO., AT RALEIGH, W. VA.

The Barrackville Explosion

A fatal explosion occurred at 12:35 p.m., Oct. 19, 1916, at Mine No. 7 of the Jamison Coal and Coke Co. This mine is located about 1½ mi. north of Fairmont, W. Va., on the Wheeling Division of the Baltimore & Ohio R.R.

Mine No. 7 is one of the new openings in this region and operates in the Pittsburgh seam, which is reached by a series of shafts having a total depth of 309 ft. There is a main hoisting shaft and a manway shaft divided into three parts, the central division containing the hoisting cage, while the divisions on either side are airways. An additional air shaft, tipple, headframe and fan are of all-steel construction, and practically all the surface buildings are of brick and stone construction with tile roofing. The mine is electrically equipped, including some coal-loading machines. The tipple has a capacity of about 2,000 tons per day. The fan is built for exhausting air from the mine, which is known to generate some gas, and the miners are furnished with electric lamps of the latest design.

Fortunately, at the time of the explosion the mine was idle, the occasion being a church holiday. Two electricians, one motorman, five machine men and two day men make up the list of those known to have been inside, and all of these were killed, while two outside men who were working about the plant were more or less injured by the flying débris.

The force of the explosion was great, being distinctly felt almost 2 mi. away, while the dense column of smoke that rose was seen at an even greater distance. The description of the observed effects of the explosion is probably best given by eyewitnesses and is as follows:

It seemed as if the world had blown up; the sky was black with débris and the earth rumbled in a fearful manner. To most observers it seemed as if there first came a terrific vibration and rumbling, while enormous quantities of material were thrown from the shaft mouth several hundred feet into the air. This was instantly followed by an enormous sheet of flame ejected from the shaft, the heat of which was intense. This flame was in turn cut off abruptly, and heavy black smoke continued to rise from the shaft for a period of several minutes.

While the mine has no outlets except the shafts mentioned, and the entire force of the explosion was therefore much concentrated, it is still quite evident from the vibration and the wreckage that the explosion was of great force and must have covered a large portion of the mine if not the whole of it. The cages were blown into the top of the headframe and appear to be completely destroyed. The ground for several hundred yards around is littered with wood, torn chiefly from the partitions in the manway shaft, and other débris, while the tile roofs of all the buildings are completely riddled. In looking over this débris on the outside one is immediately impressed by the entire absence of coal dust, which seems to have been consumed either within the mine or immediately upon coming in contact with the outer air.

There was no scarcity of volunteers for rescue work. In addition to the Jamison company's organization, the Fairmont Fire Department was on the ground almost immediately, as was the helmet force of the Consolidation Coal Co., but nothing in the way of rescue work could be attempted at the time. During the afternoon the fan was repaired and started, and reversed about 4 p.m. The same evening the United States Bureau of Mines rescue car, in charge of Chief Engineer L. M. Jones, arrived and the Government force immediately took charge of the rescue work.

While no one present agreed with him, Chief Engineer Jones expressed the opinion that some of the men might still be alive, and about midnight a rescue party attempted to enter the mine. The shaft had not been repaired and it was necessary to go down in a temporary rig. Mr. Jones, leading his party, had advanced into the mine between three and four thousand feet when he suddenly signaled to his men to take him out and collapsed. The men made heroic efforts to get their leader out of the mine, but the débris over and around which they were obliged to work made progress extremely difficult.

Finally, finding that Mr. Jones was dead and they themselves were becoming rapidly exhausted, the men left the body and hurried to the foot of the shaft, from which point a fresh party immediately started and brought out the body. Although it was fully evident that Mr. Jones was dead before his body was abandoned by the first party, every possible effort was made on the surface to revive him with the lungmotor, but without success.

After the death of Mr. Jones no further efforts were made to enter the mine, and every energy was devoted to repairing the shaft so that the regular cages, extra ones of which were on hand, could be put in operation. By Saturday night the guides had been replaced in the shaft and a cage was in operation, so that about 30 men were able to start work at the bottom of the shaft replacing brattices.

In the meantime an additional force of men had arrived, equipped with rescue outfits, both from the United States Bureau of Mines station at Pittsburgh and the rescue corps of the Frick Coal and Coke Co. A method of procedure was mapped out by which it was decided to reëstablish the ventilation by repairing the stoppings, keeping the helmet crews about 200 ft. in advance of the working parties. This plan is being carried out at present, and it will probably be Wednesday or Thursday before the work will be completed and the bodies recovered.

The body of one man was found close to the bottom of the shaft, by the first party that went down shortly after the explosion. The body of a second man was also found not far from the shaft, shortly after the permanent cage was placed in operation. The several rescue parties on entering the mine passed through the mine stable where they report seeing 27 dead horses and mules. The bodies of the two men so far recovered are terribly burned and mutilated. This describes the condition up to 6 p.m. Sunday night, Oct. 22.

If Two or More Railroad Carloads of Coal are to be represented by one gross sample, and if the cars contain different amounts of moisture seemingly in excess of the maximum moisture content guaranteed, moisture samples should be taken separately from each car. If a single gross sample is to represent several days' delivery, and if because of heavy intermittent rains there is a considerable difference in moisture content between each day's delivery, and each contains moisture in excess of the maximum content guaranteed, then a special moisture sample should be taken representing each day's delivery. Payment for the entire quantity on account of ash and B.t.u.—"dry coal"—is determined from the analysis of the gross sample, but corrections on account of excessive moisture should apply to the particular car or day's delivery.

National Safety Council Meets

By R. Dawson Hall

SYNOPSIS—The National Safety Council holds a most successful meeting at which the mining section is well represented. A new universal danger signal is adopted, and preparation is made to issue a series of loose-leaf bulletins on safety practices. B. F. Tillson, of the New Jersey Zinc Co., becomes chairman and H. G. Davis, W. A. Luce and W. Connibear are the vice-presidents for the ensuing year.

The National Safety Council convention flooded the city of Detroit from Monday, Oct. 16, till Friday, Oct. 20. The meeting was far and away the largest which the Council has ever held. As a result it was hard to secure place at the hotels for many of the guests, even with all manner of makeshift provisions.

On Monday the special committees held their executive sessions, the main business of the organization not commencing till the following morning, when Arthur T. Morey, of the Commonwealth Steel Co., the president of the council, occupied the chair.

In the report of the president it was stated that though in 1913 there were only 40 members, there are now 2,302; and the officials thus represented have charge of the safety and management of 3,500,000 workmen.

Work of Council Is Continually Expanding

He stated that the association received from dues alone an annual revenue of $48,000. It has no bills unpaid, and a small margin in the bank, though that result has been secured only by stringent economy and restricting the service to the members along lines which it was most important should be extended. Unfortunately, too much economy had been necessary, and Mr. Morey declared the National Safety Council dollar the hardest worked dollar he had ever seen.

The work of safety has been extended through coöperation with the Department of Education at Washington, with the National Fire Prevention Association, the Boy Scouts, the American Museum of Safety and the public service commissions of the United States, and also by the absorption of the American Mine Safety Association and the formation of a Mining Section which is already doing splendid work.

A loose-leaf bulletin service entitled "An Informational Series of Safety Practices" has recently been started. The service will be extended by the regular distribution of loose leaves for binding purposes. It will not supply standards of safety because that is thought inadvisable, but it will show the nature of the hazards which safety engineers must meet. An attempt will probably be made to secure a distribution of Home Safety Bulletins, so as to interest the wives and the children of workers in industrial and other forms of safety, and for the purpose of cultivating in the minds of coming workers a sentiment in favor of care in the performance of any work in which they may later engage.

R. W. Campbell, chairman of the Finance Committee, stated that there was $1,200 in the bank and $1,769 of unpaid dues—the latter figure proving by its moderate size that the organization is conducted on true business principles. It is expected that the Council will receive from dues about $60,000 during the coming year, and perhaps $75,000.

In the afternoon a general round-table discussion was held on "Maintaining Interest in Accident Prevention," the chairman being H. W. Forster, chief engineer of the Independence Inspection Bureau, Philadelphia, Penn. In the evening W. L. Chandler, the chairman of the subcommittee on the "Universal Danger Sign," reported the outcome of the committee's investigation into the visibility of signals, an inquiry which had been made with the idea of recommending to the members of the council a danger signal for use in all industries.

An ingenious method of testing signals was shown in a darkened room, the signs being illuminated by a light the intensity of which could gradually be increased or diminished by manipulating the handle of a rheostat. In poor light there was found to be hardly any difference between red and black in the visibility of a surface so painted. It was found that ovals such as are used in the standard sign adopted by the Pennsylvania Department of Mines have a low visibility compared with signs of a diamond shape.

It was noted that a square hung by one corner was more visible than one hung from two corners, and the eye seemed more easily able to distinguish a diamond where the horizontal diagonal was shorter than the vertical. As, however, this restricted the diameter of any superposed insignium of danger, and as such a sign was not in itself sufficiently distinctive, it was necessary to widen the horizontal diameter to, at least, a substantial equality with the vertical diameter.

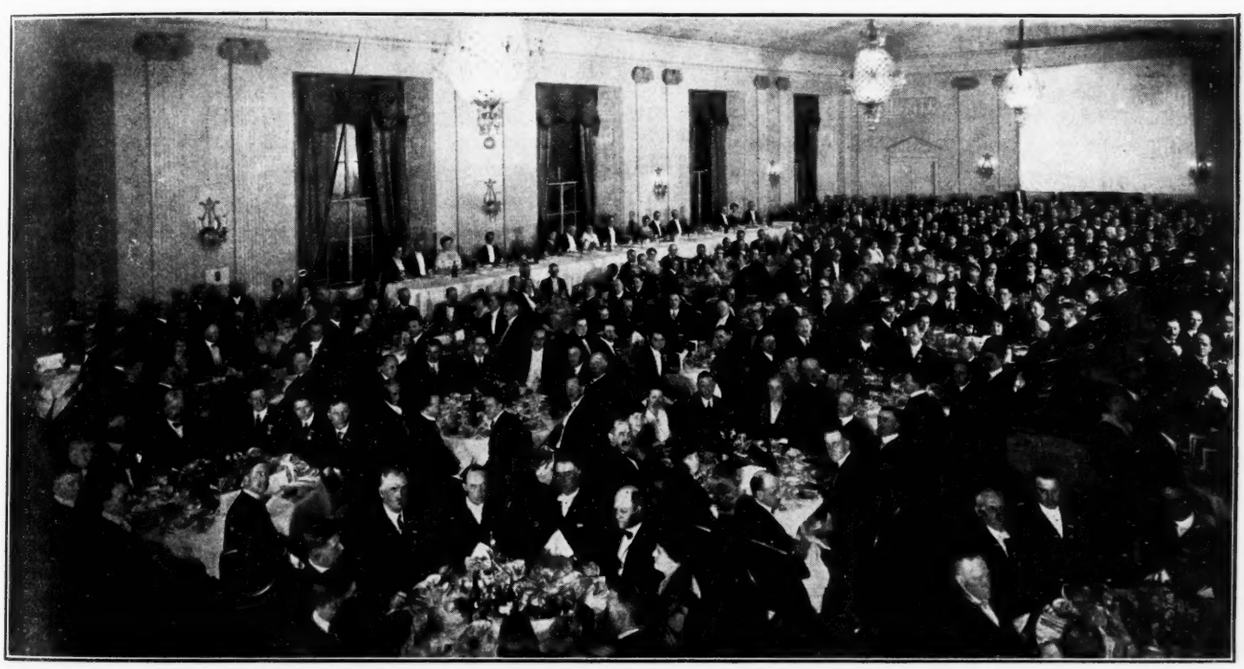
The red ball which has been so generally approved was superposed on the diamond square by the committee, and it brought out the lighter portions by its strong contrast almost as well as if really of black, which indeed in the darkness it closely resembles. The symbol recommended is an 11-in. square, placed as if suspended from one corner, with a red ball (disk) 8 in. in diameter at the intersection of its diagonals and a black St. George's cross along the diagonals of the square, the 1½-in. arms of which reach but do not cross the red ball. For further definition a black border, which may be of any thickness from ½ in. upward, is added. The Ohio safety engineers approved the design but objected to its introduction, arguing that it might be ordered by the Public Service Commission and much expense might be incurred in the scrapping of all old signs.

UNIVERSAL DANGER SIGNAL

It was urged, on the other hand, that uniformity might more conveniently be sought now than later. Legislative difficulties are fewer now than they might be in years to come. It was suggested that the council furnish to members at a low price printed copies of the proposed sign, to be glued on sign boards and varnished so as to secure permanence. By resolution the executive com-

mittee was requested and empowered to copyright the design, if possible. It is expected that once it has been generally adopted its meaning will be as readily apprehended as that of the red cross.

Sydney W. Ashe's address on "Light and Its Relation to Danger Signs" then followed and was demonstrated by several experiments. Mr. Ashe is in charge of the Educational and Welfare Department of the General Electric Co. at Pittsfield, Mass, On the morning of the second day the mining, iron-and-steel, chemical, foundry, public-utilities and steam-railroad sections all held meetings, but in these columns attention will be exclusively given to the first. In the absence of H. M. Wilson, the chairman, B. F. Tillson, the vice-chairman, presided. The secretary, H. M. Wolflin, was represented by Edward Steidle. Mr. Wolflin is now located in California, and being somewhat indisposed was unable to make so long a journey.



THE BANQUET OF THE NATIONAL SAFETY COUNCIL, ON OCT. 19, WAS ATTENDED BY 561 PERSONS

The reports of committees contained few matters of general interest. J. W. Paul, chairman of the subcommittee on standardization, advised the formation of several committees on that subject instead of the one all-embracing committee to which standardization has hitherto been delegated, but no action was taken. H. G. Davis, E. E. Bach and C. E. Pettibone were appointed as a nominating committee. They decided to move up the officers in the order in which they now stood. Thus B. F. Tillson, mining engineer, New Jersey Zinc Co., Franklin Furnace, N. J., becomes chairman; H. G. Davis, district superintendent, Delaware, Lackawanna & Western R.R., Coal Department, becomes first vice-president; W. A. Luce, general superintendent, Ellsworth Collieries Co., second vice-president, and William Connibear, safety inspector, Cleveland Cliffs Iron Co., Ishpeming, Mich., third vice president.

Albert H. Fay then read his paper on "Accident Statistics," emphasizing the need for uniformity in the recording of accidents. Dr. Royal Meeker, commissioner of the Bureau of Labor Statistics of the United States Department of Labor, argued that the actual time of miners ought to be ascertained as a basis on which to reckon the accident hazard. It was not enough to know the putative days worked, but the actual number of hours during which the miner is occupied underground. He said that certain operators had consented to compile the figures, though he admitted the matter was a difficult one where there were several openings by which the mine was entered. He urged that the compilation of statistics is really a productive work just as certainly as the swinging of a pick or the handling of a shovel.

Prof. F. W. Sperr, professor of civil and mining engineering, Michigan College of Mines, advocated accident classification according to methods of mining, as such a classifying brought the real hazard and its outcome into suggestive juxtaposition. He stated that just as the time of exposure to accident was the undetermined factor in coal mining, in metal mining the information most needed and least available was the relation between the method of mining and the accident rate. H. D. Mason, of the Mine Safety Appliances Co., Pittsburgh, Penn., stated that the public was vitally interested in obtaining statistics on the number of fatalities caused by unlocked safety lamps. A. H. Fay said that, in a report shortly to be published by the Bureau, he hoped to cover this matter and enumerate the explosions occurring within the last five years, classifying them according to cause.

Articles were read on "Mine Safety Signs and Signals," by D. J. Parker and Edward Steidle, of the United States Bureau of Mines; on the "Qualifications of a Mine Foreman," by J. W. Paul, consulting mining engineer of Pittsburgh, Penn.; on "Workmen's Compensation and Its Effect on Safety in Mining," by H. M. Wilson, of the Associated Companies, Pittsburgh, Penn.; and on the "Relation of Workmen's Compensation Laws to the Accident-Prevention Movement," by Dr. F. D. Patterson,

chief of the Division of Hygiene and Engineering, Pennsylvania Department of Labor and Industry, Harrisburg, Penn.

In the discussion of the last two papers a member from Ontario declared that the introduction in that province of industrial compensation insurance, using a system by which each group of industries is separately assessed according to the ascertained hazard of the occupation, would do much to decrease risks. Some of the groups had already banded together to reduce accidents.

It was pointed out, however, that where the group did not have to face competition with similar groups in other states, there was little financial advantage in reducing the amount paid for insurance. Thus there was no real monetary incentive to cause the operator or manufacturer to expend money for the prevention of accidents, for if there is no competition with groups *without* the province, as the cost of compensation falls on every one *in* the province equally the competitional conditions between the operators and manufacturers remain wholly unchanged. But where by the expenditure of safety money, Brown can obtain a rate better than Robinson, who has to compete with him in the market, Brown is obviously advantaged when he spends that money if the reduction in the amount of the first few premiums will be such as to reimburse him. Where one state or province is in close competition with another there is some incentive to spend money to reduce accidents, but the inducement is even then less obvious than it is when each individual forms a separate insurance entity.

Inadvisability of Shorter Waiting Period

It was stated that there was a strong movement afoot in Pennsylvania to shorten the period for which an injured person must wait before being entitled to compensation or to abolish it altogether and to increase the rate of compensation from 50 to 66⅔ per cent. of the former earnings of the employee. Dr. Patterson viewed the last proposition with favor, but he believed the waiting period should not be removed. As it is, the operator has to pay $25 in minor operations and $75 in major. These are the maxima amounts, but experience shows that the maximum is always demanded by the operating surgeon.

M. D. Cooper, assistant superintendent and safety engineer of the Ford Collieries Co., Oakmont, Penn., said that the waiting period might well be abolished where there was no question of malingering possible. When a man loses an eye or a foot or a hand he is necessarily kept from work for a longer time than the waiting period. The rule which was introduced to prevent malingering was unnecessary and useless in such obvious cases of temporary or permanent incapacitation and inflicted much hardship on the workman who was injured.

Commissioner Smith, of the Michigan coal operators' association, agreed with Mr. Cooper that the waiting period was unnecessary whenever there was physical evidence of incapacitation. Dr. Patterson declared that the suggestion of Mr. Cooper if embodied in law would probably be found unconstitutional. In Pennsylvania the accidents reported, which formerly numbered 35,000 a year of which about 700 were fatal, had increased to some 20,000 per month. When any company had more than the average, and some seemed to have a most unenviable record, this company was notified and urged to use greater care in safeguarding its employees.

Mr. Ensmiger, of the Prest-O-Lite Co., said that 90 per cent. of the accidents were of a character that made them noncompensible, as they did not exceed the 14 days waiting period, so the proposed change that abolished that period was quite important.

The chairman was of the opinion that the waiting period was a good provision both for the employer and the employed. The New Jersey Zinc Co. at one time used to pay half-time from the occurrence of accidents. When the compensation law was passed in the State of New Jersey it changed its compensatory provisions to comply with the clause of the law which required a waiting period. He found that as a result of the change the men were not so anxious to remain idle, and the families made more money than they did under the more liberal arrangement.

Alleged Back Injuries Difficult To Meet

Dr. Rose said that it was a mistake to raise compensation allowances, for many men would rather live without work provided they could get a 50 per cent. compensation. He knew one man whose wages were $16, who was injured or claimed he was injured and was drawing $32 a week in all from the company and the lodges to which he belonged.

Cases where an injury to the back was alleged were the hardest to deal with. It was extremely difficult to tell whether a man was shamming or not. He had asked Dr. Cooley, the great English authority, what should be done in such cases, and Dr. Cooley replied: "Strap the man down. If his spine is really injured, the apparatus will give the man immediate relief; and if he is shamming, he will soon weary of such treatment."

H. G. Davis, district superintendent of the coal department of the Delaware, Lackawanna & Western R.R., gave an address with stereopticon views on "Mine Accidents and Their Prevention." He said that it was hard to induce the contract miners to stay by their laborers after the coal had been shot down. He showed on the screen a miner warning his laborer that a piece of slate needed posting. The miner, however, failed to stay and help post the place, and his laborer was killed. Mr. Davis stated that it was regarded as a sign of skill in mining when a miner got home first. He said the women would tell their men: "What was wrong wi' ye the day? Davie's been home an hour a'ready." It is petticoat criticism of this sort which has tended to shorten the day in the anthracite region to the disadvantage not only of production but of safety.

The company tried some time ago through the medium of moving pictures to teach the lesson of temperance in its relation to mining work. It rented a store and proceeded to turn it into a good likeness of a saloon and then used it to illustrate how a man on his way to work is rendered unfit for that work by indulgence in liquor. The man goes to the mine, and because he is not in his right senses he is killed. This scenario proved offensive to the miners. They regarded it as a reflection on both the sober and the drunken employees. They overlooked the fact that there were only a few men who were disposed to indulge in a "morning glory" on the way to work and that these men in consequence of their bad habit menaced every one who had to work

with them as well as endangered themselves and shamefully neglected the interests of their families.

One way in which men are injured is in the removal of material from abandoned places. Mr. Davis said that his company endeavored to reduce or altogether avoid such loss of life by ordering that all material be brought out before the room is abandoned. The miner draws this material and is paid for his labor.

In order to prevent men from being pinched between the cars and the rib or posts in a room, each miner is given a distance piece by which to measure the clearance. In pitching places only the runner is allowed to take cars from the face. A rule has been made that men shall be obliged to go home when a shot misses fire. This has not been a wholly successful provision, for with such a penalty for failure to make a satisfactory shot, the miner is quite apt to say nothing about the matter. When the failure is not reported the danger is enhanced.

Mr. Davis said that a cowbell was now used on the rear end of every trip so that the trip rider will always know if his trip is broken. Mr. Pettibone stated that this worked well if the car had a flat wheel, but a smooth-running car would not jar enough to keep the bell ringing. John Lloyd, of the Lehigh Valley Coal Co., advocated the suspension of the bell by a helical spring. Such a bell would ring even if on a car with perfectly smooth wheels.

Foremen Required To Understand First Aid

In commenting on Mr. Paul's remarks on the qualifications of mine foremen, E. E. Bach, sociological superintendent of the Ellsworth Collieries Co., said that all their foremen are required to understand first aid. J. P. Reese, general superintendent of the Superior Coal Co., Gillespie, Ill., stated that in that state "managers" who have not studied first aid and mine-rescue work are not licensed any more. Mr. Bach said that the first-aid men of his company were trained in their own time, and Mr. Davis said that in general this was the practice of the Delaware, Lackawanna and Western Railroad Co., Coal Department.

Mr. Reese said he had some difficulty in getting enough men to undertake this work without pay. He felt there should be capable men in all parts of the mine, but with few men taking the training it was sometimes hard to dispose of them so that at every point there would be first-aid men who could be relied on to render assistance to their fellows whenever needed. Mr. Reese added that the names of qualified rescue and first-aid men were posted at all partings, and the place of working was also stated, so as to make the prompt locating of them when needed as easy as possible.

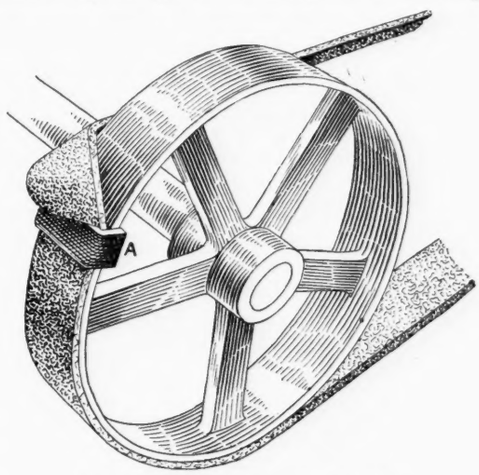
In the evening the mining members held a combined dinner and smoker at the clubrooms of the Board of Commerce and were entertained by cabaret singers. Thomas T. Read, now of the New Jersey Zinc Co., New York City, delivered an address on the mineral resources of China, illustrating his remarks with a stereopticon. After a skit on the operations of rescue crews by some of the members, and a session of yarn telling, the meeting adjourned.

The second session of the mining section, the banquet of the institute and the interstate first-aid contest still remain to be described. They will be given place in the next issue of *Coal Age*.

Placing Tight Belts on Pulleys

At a plant where a number of belts are used very tight and in consequence are difficult to place on their pulleys, the small device shown at *A* in the illustration makes the task of placing a tight belt an easy one, according to A. E. Holaday, writing in the *American Machinist* for Oct. 19, 1916.

The device is made of ⅛ in. flat steel about 2 in. wide. It is bent at right-angles at the ends, the bends being made



REPLACER FOR TIGHT BELTS

so that the contrivance will fit the width of the pulley face. The ends are about 2 in. long. By starting the belt on the pulley and holding this angle iron over the belt, the latter can be run on without difficulty. To avoid accidents the belt should be run on either by hand or at a very slow speed.

COMING MEETINGS

The American Mining Congress will hold its 19th annual session during the week beginning Nov. 13, 1916, at the Hotel La Salle, Chicago, Ill. Secretary, James F. Callbreath, Munsey Building, Washington, D. C.

The Coal Mining Institute of America will hold its annual meeting on Wednesday, Thursday and Friday, Dec. 6, 7 and 8, 1916, at the Fort Pitt Hotel, Pittsburgh, Penn. The annual dinner of the Institute will be held on the evening of Dec. 6.

Illinois Mining Institute will hold its fall meeting Nov. 25, 1916, at Springfield, Ill. All those interested in coal mining should attend this meeting. A fine program has been arranged, the banquet in the evening being held at the St. Nicholas Hotel. Secretary, Martin Bolt, Springfield, Ill.

The American Institute of Electrical Engineers will hold its 326th meeting in the Engineering Societies Bldg., New York City, Friday, Nov. 10, 1916, at 8:15 p.m. The general subject of the meeting will be Inventories and Appraisals. Secretary, F. L. Hutchinson, 33 West 39th St., New York City.

Engineers' Society of Western Pennsylvania will hold its structural section bimonthly meeting Tuesday, Oct. 31, at the rooms of the society, Oliver Building, Pittsburgh, Penn. A paper on "Factors Affecting Costs of Structural Steel Shop Work," by E. W. Pittman, manager of the Rankin plant of the McClintic-Marshall Co., and George H. Danforth, structural engineer of Jones & Laughlin Steel Co., will be read. Secretary, Elmer K. Hiles, Pittsburgh, Penn.

In Spite of Every Precaution Taken to Prevent Loss of Moisture during the collection, preparation, and analysis of coal samples, it is certain that loss of moisture may occur; also there may be too little or too much slate, bony coal, or other foreign matter collected in what is otherwise a truly representative gross sample, so that the determination of the heating value or ash content does not strictly agree with the actual value of these factors in the coal delivered.

The Labor Situation

General Labor Review

In the anthracite region a strike of the Moosic Mountain and Mt. Jessup collieries occurred on Oct. 19 as a protest against the irregularity of the transportation facilities furnished the mine workers. They claim that they are delayed in returning to their homes in Jessup in the evening by reason of the uncertainty of the service.

The delegates from the ninth district of the United Mine Workers of America, including Schuylkill, Northumberland, Columbia and Dauphin Counties, convened from Oct. 17 to Oct. 21 at Mt. Carmel, Penn., and named the following officers for the present year: President, James Matthews, Shenandoah; vice-president, John Strambo, Mahanoy City; secretary-treasurer, James J. McAndrews, Locust Gap; international board member, Martin A. Nash, Glen Carbon.

Prosperity and Aims of Schuylkill Union

The paid-up membership in August, 1915, was 37,178 and in August of this year 38,221, an increase of more than 1,000. The district loaned $45,000 during the past fiscal year to the international board and disbursed for district expenses $24,630.74. President Matthews recommended that the waiting period in the compensation law be reduced from 14 to 6 days and urged that if the incapacitating injury lasted over that shorter period, payment should be made to the injured person from the time at which the injury was received. He advocated that the death compensation be lengthened from 300 to 500 weeks and that total disability compensation be paid for 700 weeks instead of 500 weeks as under the present law. Compensation should, he said, be raised from 50 to 66⅔ per cent. of the wage received by the workman before the accident. Workmen who contract miners' asthma should be compensated as for total disability.

Three locals which had been suspended made a strong fight for representation. They endeavored to have an executive session held to decide their contention. This was resisted by the officials, and their standing before the convention was discussed in open session. The session in 1918 will be held in Mahanoy City.

Mining Machine Agitation Ends in Violence

The miners of the Delaware, Lackawanna & Western R.R., Coal Department, have been objecting to the introduction of mining machines. They sent a committee to the company protesting against the introduction of the labor-saving devices, and as the latter were not removed some one early on Friday, Oct. 20, destroyed one of the machines in the National mine at Minooka with a charge of dynamite.

In central Pennsylvania a strike of 5,000 mine workers employed by the Rochester & Pittsburgh Coal and Iron Co. seemed likely to involve affiliated companies in Clearfield and Indiana Counties, but the miners finally returned to work. The miners want a new scale, claiming that they did not agree to the one now in operation. The explosion in Eleanora slope is regarded as a part of the union activity, but there is no proof that this is a fact.

The mine workers at No. 1 mine of the Pennsylvania Coal and Coke Corporation at Gallitzin are on strike, but it is hoped that the differences will soon be settled.

Will Miners Shorten Working Day to 4 Hr.?

John P. White, the international president of the United Mine Workers, declared at Nanty Glo, Oct. 20, that he was only advocating the 7-hr. day as a temporary measure. He said that the truth of the matter was that the miners could dig all the coal the country needed in a 4-hr. day.

In the Pittsburgh district over 90 per cent. of the nominations made by the local unions have been in favor of the president, Philip Murray, who was recently appointed to replace Van Bitner. Robert Gibbons is named by these unions as the acceptable candidate for vice-president. There are some scattering votes for other persons, but five locals must agree on a candidate or his name cannot appear on the ballots.

When John P. White was addressing a meeting of striking miners at Creighton, Penn., W. Earle Iseman, mine superintendent and part owner of the Cornell Coal Co., with five special policemen entered the meeting with the purpose, it is said, of arresting some of the audience. The mine workers claim that the deputies tried to break up the meeting. Whatever are the facts as to the source of the trouble, the outcome was the wounding of two men. One, a miner, was shot in the neck and the other, a deputy sheriff, had a rib fractured.

The mine workers released a prisoner that the deputies had taken, drove the deputies to the company's office, took away their revolvers, and beat them severely. Iseman claims that he and his men were beaten while taking the numbers of the automobiles which conveyed the speakers at the meeting and which had been driven onto the private property of the company. The other speakers at the meeting were Vice-President F. J. Hayes, T. L. Lewis, of the American Federation of Labor, and district-president Philip Murray.

Vandalia Coal Co. Has To Close Dugger Mine

The strike of the Vandalia Coal Co. employees in Indiana has come to an end. The company agreed as a concession to let the miners at the Dugger mine have the use of electric safety lamps without charge, but they would not accept them even under that liberal provision. Finally, the company settled the matter by shutting down the Dugger mine entirely. The international union officials have been opposed to the action of the local unions in this matter.

Perhaps the men had a legal right to strike, but they were morally in the wrong. The introduction of electric lamps into the mine was a change in mining conditions and might justify a reconsideration of contract terms. However, it was a change which was absolutely necessary, and the mine workers should have realized that it increased their safety, and if the lamp service was charged at only 3c. per day the change would increase their earnings. They could have rectified conditions if they did not like them at the end of the biennial period.

Oklahoma Mine Workers Are Keen To Strike

In Oklahoma as a result of the break in the negotiations between operators and miners over the biennial contract, three mines have closed, laying off however only about 450 men. The operations thus laid idle are the Brewer mines of the Southern Fuel Co. and the Samples Coal Co.'s shaft No. 2. The strike is in defiance of the officials of the United Mine Workers of America, who had agreed not to call a strike till a convention had been held at McAlester.

Union Attitude to Arbitration

The mine workers like the trainmen of the country are strongly opposed to compulsory arbitration. George Hargrove and Charles Batley, acting president and secretary respectively of the United Mine Workers in the Kanawha district, sent the following letter to United States Senator William E. Chilton and to Congressman Adam B. Littlepage at Washington when the country was still apprehensive that a strike of trainmen was imminent:

We see by the press that in view of the threatened railroad strike that is likely to tie up the whole nation Congress is contemplating the passing of a law similar to the Canadian Disputes Act, which is a compulsory arbitration law. In the name of the 20,000 miners in the Kanawha district of West Virginia we appeal to you as our representative to vote against any such measure and to use your influence against it.

The "United Mine Workers' Journal" takes a similar view in an editorial. It is a questionable stand for the workingman to take. He is always seeking a change in the status quo and should prove his right to that modification. The man who may more excusably be opposed to submitting his rights to a tribunal is one who desires a continuance of past conditions—namely, the coal operator.

The unions are always in the position of the litigant who is trying to reopen a settled case and therefore should be compelled to show that the status has changed and that previous decisions are subject to reconsideration. It is true that this necessity can often be shown, but the attitude that if we lose we go into the same court again and if we win we won't let the other man go into court, is one which no self-respecting people would accept.

Editorials

The Fruits of Competition

The current coal shortage has features that are unusual. Normally, it is the consumer who pays, but there are many instances this year where the shoe is on the other foot. The wholesaler is bearing the brunt quite generally, but where the coal industry is pinched the hardest the trouble can be traced directly to a monumental lack of foresight on the part of mine owners and selling agents combined. Present conditions are a bitter dose for these one-time opportunists.

Not only are producers unable to take full advantage of panic prices, but they are under stiff obligation to fill contracts undertaken when tonnage seemed the only objective. The sales departments have their share of blame, but more than one coal operator must be looking back with amazement at a state of mind that permitted him in 1915 to take business 18 months into the future when a world war was in progress and marine freights were already responding to a world-wide demand for tonnage. But the real fruits of the adventure are just now, when the very agencies that moved heaven and earth to secure contracts at any price then obtainable are forced to pay the full current spot market to their less eager competitors in order to meet contract obligations.

There are United States Government contracts still in force for Pocahontas and New River on which exactly this procedure has been lately followed. Naval colliers cannot be detained awaiting better car supply, nor can ships chartered to the Panama R.R. be held up without penalty. It is all a most expensive business, driving ahead to get tonnage with too much indifference as to net returns.

There are some glaring instances of this situation in New England. In October, 1915, three large Pocahontas and New River factors and at least one of the Georges Creek shippers entered into the liveliest sort of war for contracts inland from Providence, R. I., and from Mystic Wharf, Boston, making eventually a more or less uniform price of $3.25 to $3.35 f.o.b. cars for deliveries during the year beginning Apr. 1, 1916. One "cut" followed another, and in a fortnight or so nearly 1,500,000 tons had been sold. The area was later extended to Portsmouth and Portland territory, and a considerable additional tonnage was placed with large consumers directly on Tidewater. The latter were favored with prices 25c. to 30c. lower than their contracts for the then current year, an absolutely needless gift. Certain of the railroads also shared in the plums. Perhaps the prize contract of all went to the Boston Elevated Ry. for a five-year term; $3.25 on cars Boston analyzed into approximately 25c. discharging, weighing and insurance; 65c. marine freight; and $2.35 f.o.b. Hampton Roads, or 95c. less selling commission at the mines. It was realized at the time as a ruinous game, but was justified on the grounds of "conditions of competition."

The coal being sold rigidly on a delivered basis and no strike intervening the sellers are bound to fill their contracts. One of the early manifestations was the chartering or even the sale of certain of their own steamers offshore at war rates and replacing with coastwise bottoms picked up in the open market. But it takes a good many slow-towing barges to do the service of 7,500-ton steamers, and heavy bills of expense were suffered.

Through the summer and early fall the shippers sought to buy all-rail coals in order to hedge on the predicted shortage at Hampton Roads. Liberal purchases were made at prices all the way from $1.35 to $2.50 at the mines and carrying a rate to big textile centers of $3.25 as against, say an 85c. rate from Boston. But now the fateful embargo has been invoked and to the agencies in arrears on their contracts and short of coal at the Virginia terminals there is no way open but to buy Pennsylvania grades at $6.50 to $6.75 alongside, or, rather than stand steamer detention, to take the smokeless product of some more fortunate competitor and pay the munificent price of $5 f.o.b.

This has happened repeatedly, at gradually ascending prices, so often that one would suppose certain shippers would never again want to be so omnivorous as to future tonnage.

All forms of squirming have been indulged in these past few months, but now something more than makeshifts are demanded. The factors who sold are responsible interests, and the rapid course of events is putting the situation up to them rather sharply.

The diet is unpalatable. For the mine owner, at least, the fruits of competition are of the Dead Sea variety.

Are Anthracite Circulars To Be Increased?

There is a persistent rumor current in the market that the anthracite producing companies are contemplating an increase in the circular prices of all sizes. At the present time it seems that the steam sizes will be the first to be offered at new figures. These are, of course, in close competition with bituminous coal and as the price of the latter is now soaring to almost unheard of heights it seems but natural for anthracite to follow. The demand for all the anthracite steam grades is particularly heavy, and if the increase is actually decided upon it can be easily justified by the law of supply and demand. Most of the companies are obligated by contracts made last spring for heavy tonnages of the steam sizes, and of course the new prices would in no way effect that business; but outside of this there is still quite a large tonnage subject to current quotations. It is understood from present reports that these new prices are contemplated to take effect on Nov. 1.

Some of the well-informed interests are inclined to believe that the prices of the domestic sizes, including pea, will also share in the increase. This is given considerable credence because of the extraordinary demand in some parts of the country for the domestic grades.

The first reports were that owing to the inability to supply the demand for stove coal this grade was to be increased in price in order to throw some of the pressure onto the other sizes. It will be remembered that some few years ago, when chestnut coal was in a similar position as to demand, the companies increased its price, since which time stove has become the popular size. Since this report gained circulation it is said that an entirely new price circular might be issued, probably on the first of the year, if conditions still warrant it.

While we have been unable to secure positive confirmation of these reports, we do know that they are based on authentic information. Furthermore, it is a well-known fact that the larger companies have shown little disposition to commit themselves as to prices beyond the current month. In addition some of the companies sending out circulars in answer to requests for prices state it is not known what the prices will be for any month beyond the present.

Should a general increase actually become effective it would be interesting to note the attitude of the miners as to this largely increased income of their employers. It has become a fixed habit in all lines of industry for the employee to insist on a share of the increased income produced by his labor, and the miners have not shown any marked bashfulness in this respect. To be sure they have just signed a new working agreement, but no one will rely on that with any feeling of security.

The Officers' Reserve Corps

In these turbulent times the thoughts of many engineers have no doubt frequently been directed to the question of how they could best serve the country in the event of war. Our peculiarly isolated position has heretofore kept us immune from any serious consideration of invasion by any foreign power, with a consequent indifference to preparedness in any intensive form. The result is, that though potentially the most powerful of any of the chief countries, we are actually the weakest in a military sense, with the possible exception of China.

But in spite of the striking example that we have had presented to us by the European holocaust, it is not the sense of the best thinkers of the day that we become a military power in the literal meaning of the word, though it is the consensus of opinion that we adopt a tentative preparedness propaganda that will form the nucleus for a defensive force in the event that an unexpected and urgent contingency arises. It is with this idea in mind that the scope of the Officers' Reserve Corps has been enlarged, by affording those who so desire an opportunity for more intensive training.

In brief the new law as it applies to engineers provides for commissions as first and second lieutenants, captains and majors. Eligibility for a commission as a lieutenant of either grade does not necessitate that the candidate possess any considerable military knowledge, but rests largely on the applicant's military aptitude and professional record. For the grade of captain, in addition to higher engineering qualifications, the applicant is required to have a working knowledge of Infantry Drill Regulations, Field Service Regulations and Part 5 of the Engineers' Field Manual, covering field fortifications. For the grade of major, the applicant is required to know the technique of modern tactics, be conversant with the duties of engineer officers and troops in war, in addition to a somewhat more detailed knowledge of the previous requirements noted for a captain.

The essential differences between the old law and the new are that under the latter the officer is subject to be called out two weeks a year for training and is also subject to call in event of hostilities or threatened hostilities. There is no doubt that the more rigid requirements will substantially increase the efficiency of the new corps. In the event of a call for volunteers, it is understood, of course, that the officers enrolled under the new law will have precedence over the members of the old corps.

The opportunity thus afforded engineers to place their services at the disposal of the country under such advantageous conditions will undoubtedly make a strong appeal to the profession. In addition to the officer corps, the War Department will soon issue regulations regarding an enlisted reserve corps for the engineers, and it is expected that many of the profession, unfitted for the responsibility of an officer, will enlist in this corps.

It is planned shortly to hold examinations in about fifty cities in different parts of the country, and all those interested in this patriotic movement should immediately address the Chief of Engineers, War Department, Washington, D. C., for an application blank. A copy of a helpful pamphlet on this subject has been issued by the five leading engineering societies and may be obtained on application to any of the respective secretaries; or, if the applicant is not a member of any of the societies, *Coal Age* will endeavor to supply him with a copy.

Rubber vs. Brass Pump Valves

The present high cost of rubber valves for pump service has caused some coal companies to substitute the brass variety for hard-rubber valves on hot-water feed pumps. Some companies have even installed small foundries in which they make their own brass, bronze and copper castings for repairs to mining machines and haulage motors, having inexpensive shop equipment to finish the castings. By using up their accumulations of scrap brass and copper they are able to effect considerable economies over buying finished brass and bronze castings in the open market.

One of the objections found to rubber valves is that they usually lie around in the storeroom or warehouse for a long time before they are used, becoming brittle and hard, while much of their vitality is lost. Brass valves will not deteriorate while in stock, but they should be inspected once a month. When found worn, they can be taken out and faced off and used over a number of times. The composition of these valves consists of about two-thirds zinc and one-third copper. Rubber valves often have to be changed on hot-water feed pumps as frequently as every 15 days; in some cases this change involves eight valves per pump.

Coal Age would like a number of articles on "Coal Mine Power Plants" and other kindred subjects dealing with the generation and application of power for mine uses. The power field in coal production is one of greatest importance, yet it is least discussed. Your contribution will receive immediate attention and be liberally paid for.

Legal Department

Workmen's Compensation Act

By A. L. H. Street*

The clause of the California Workmen's Compensation Act which precludes recovery for injury to an employee due to his own "willful misconduct" has been considered by the Supreme Court of the state in a case where a miner working in one shaft of a mine was ordered to go to another when he should finish his work in the first. Instead of going directly to the second shaft, he stopped for a short time in the shade of an ore bin on the surface, to rest, the day being insufferably hot, and was killed by a collapse of the bin.

An award of compensation for his death was resisted on the ground that his own wilful misconduct led to the accident, but the court holds that there is liability under the act, it appearing that the place was commonly used by employees for resting and had been regarded as safe. (Brooklyn Mining Co. vs. Industrial Accident Commission, 159 Pacific Reporter, 162.)

Damage-Liability for Delay in Delivery of Coal

One of the most important legal principles touching business contracts is the rule that, although a party to an agreement may be in default under it, his liability in damages is limited to such damages as were reasonably within the contemplation of both parties at the same time the contract was entered into. Application of the rule is well illustrated by a decision lately handed down by the Supreme Court of Arkansas in the case of Thomas vs. C., R. I. & P. Ry. Co., 176 Southwestern Reporter, 681, in which the plaintiff claimed special damages resulting from delay on the part of defendant railway company in delivering a shipment of coal. It appeared that the coal was ordered by the plaintiff, a rice grower, for use in running the engine which pumped water for growing rice, and that by reason of unreasonable delay on the part of the carrier in delivering the fuel plaintiff's crop was ruined. The trial court permitted him to recover the amount of his loss as a consequence of the delay, but the Supreme Court reversed the judgment on the ground that such loss was not a proper measure of damages, because the railway company was not apprised when the contract for transportation was entered into as to the purpose for which the coal was to be used.

The same principle seems to be applicable as a general rule to delays on the part of sellers of coal in making delivery. That is, where the seller is not apprised when the contract is entered into as to the purpose for which the coal is ordered by the buyer, the measure of damages is the excess of the market value of the coal at the agreed time and place for delivery above the value of the fuel at the time of actual delivery. But if the contract is entered into in contemplation of the buyer's use of the coal for resale or for other specific use, the seller is chargeable with any special loss sustained by the buyer as a natural consequence of the seller's failure to make delivery within the agreed time, if the buyer was unable to reduce the amount of his damages by procuring the required fuel elsewhere.

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Recent Judicial Decisions

Negligent Storage of Explosives—A coal-mining company may be held liable for injury to employees resulting from explosion of powder negligently stored in a boarding house occupied by the employees, although the boarding house was conducted by a third party, if the powder was under the control of the company. (United States Circuit Court of Appeals, Sixth Circuit, Keystone Coal and Coke Co. vs. Fekete, 232 Federal Reporter, 72.)

Liability for Assault by Foreman—A coal company is liable for an unlawful assault committed by its foreman in ejecting an employee from the company's premises, if the assault was committed in the line and scope of his authority. Testimony tending to show that the foreman was ordered to eject plaintiff is legal evidence that the assault was committed in the line of the foreman's employment. (Tennessee Coal, Iron and Railroad Co. vs. Rutledge, 71 Southern Reporter, 990.)

Validity of Mine Union Federation—It is beyond the power of a miners' union organized under the laws of Montana, for the purpose of promoting the interests of its members, to surrender this authority to a federation of unions, subordinating the union to the control of the federation and stipulating for forfeiture of the union's property to the federation on expulsion or withdrawal from the federation. (United States District Court, District of Montana; Moyer vs. Butte Miners' Union; 232 Federal Reporter, 788.)

Acceptance of Coal by Buyer—If a buyer of coal accepts a shipment after inspecting it and discovering that it is not up to the grade ordered, pays freight, demurrage and switching charges, removes the coal and resells it at a lower price, he cannot counterclaim damages on account of the charges so paid and the loss entailed on the resale, when the seller sues for the agreed price. The buyer must pay the whole contract price. (Pennsylvania Superior Court, Luella Coal and Coke Co. vs. Gano, 61 Pennsylvania Superior Court Reports, 37.)

Knowledge of Coemployee's Incompetency—One employed by a coal operator to mine coal did not necessarily assume the risk of being injured through reckless operation of a motor by another employee, although the injured man knew that the motorman was reckless; the injured man having complained of the danger and having been assured that it had been avoided by warning the motorman against reckless driving. In a suit brought to recover damages for the injury, it was a question for the jury to determine, under the peculiar circumstances, whether plaintiff assumed the risk of the motorman's incompetency. (Virginia Supreme Court of Appeals, Riddley vs. Clinchfield Coal Corporation, 89 Southeastern Reporter, 926.)

Duty To Provide Drag for Tramcars—A miner in a New Mexico mine was injured through running away of a loaded car in a chamber and its consequent derailment. Held, in his suit to recover damages: "There is no doubt that the statutory law of New Mexico required that one or more drags should have been attached to the car, which would undoubtedly have prevented a collision with plaintiff. . . . Independently of any legislation, the common law obliged the defendant to provide a suitable drag or drags, which were the customary and simple preventive of such an accident, which was liable to occur at any time." The duty "rested on the defendant as a part of its obligation to furnish a suitable and reasonably safe place for the employment of the plaintiff, from which the defendant could not have relieved itself." (United States Circuit Court of Appeals, First Circuit; Victor American Fuel Co. vs. Tomljanovich; 232 Federal Reporter, 662.)

Department of Human Interest

Ebensburg First-Aid Contest

The Ebensburg, Penn., first-aid meet, which received short notice in our issue of Oct. 7, p. 591, deserves some further consideration. All the contestants were uniformly attired, and the field was even more attractively arranged than usual. There is a considerable advantage in having all the contestants similarly and effectively garbed. Just as the uniform of a soldier promotes loyalty and unity, so a similarity in dress binds the first-aid men together in a strong bond of union. It would be still better if we could devise a uniform that would be peculiar to those who enter the first-aid army to fight for the lives and limbs of their fellowmen. It would give a dignity to a work that is almost wholly unrewarded, but one that should not be unhonored as well.

The meet received strong local recognition. Even the Cambria County Court was adjourned so that all the people could be present at the contest. The prizes did not consist of money, but were expensive awards, dignified and worthy of the work in which the contestants were engaged: A trip to Detroit to endeavor to carry off the national championship at the meet

GALLITZIN TEAM WITH ITS PATIENT BANDAGED FOR BROKEN BACK AND FRACTURED FOREARM

of the National Safety Council, watches, a silver cup and pocketknives are all better than money as awards.

The Gallitzin team of the Tunnel Coaling Co., composed of Thomas McLaughlin, captain; William O'Brien, William Ruffley, George Slusser, John Cheslock, and George Watts, patient, took first place with a score of 99.8. The team is shown in the accompanying photograph, which was taken after the men had completed the first event—bandaging a broken back and fractured forearm. The second event required the proper treatment of burns on the hands, face and neck. The after-damp was assumed to be so severe as to render a man unconscious and to overcome the rescuers.

The third event presupposed a fractured right collarbone, a wound in the hand and a dislocation of the left shoulder.

Barnesboro, Penn., Starts Series of First-Aid Meets

Under the supervision of the United States Bureau of Mines the Barnesboro Board of Trade held a mine-rescue contest and first-aid meet at the Municipal Park in Barnesboro, Penn., on Sept. 4. This demonstration was held in connection with the dedication of the park and the celebration of Labor Day. Dinner and supper were served by the Village Improvement Society. A baseball game, fireworks and dancing completed a day crowded with events and entertainment.

Fourteen teams competed in the first-aid meet, which was held in the morning. The manager of events was J. T. Ryan, safety engineer, of Pittsburgh. Physicians from mining towns judged the teams, which had been instructed by John V. Berry, whose Bureau of Mines car had been in this district for some time.

The teams were: Barnes & Tucker Coal Mining Co., Barnesboro, three teams; Clearfield Bituminous Coal Mining Co., Barnesboro, two teams; Cymbria Coal Co., Barnesboro, two teams; Duncan Spangler, Hastings, one team; Empire Coal Mining Co., Barnesboro, one team; Madeira-Hill Coal Mining Co., Barnesboro, one team; Pennsylvania Coal and Coke Corporation, Moss Creek, one team, and Hastings, one team; Watkins Coal Co., Barnesboro, two teams.

The teams competed in one-man, two-man and full-team events with the following results:

Five teams tied in the one-man problem: Lacerated scalp, profuse bleeding, a simple fracture of the right collarbone, wound of the thigh with shock. Time allowed, 15 min. The toss-up gave the prizes, Kohler lamps, to the Pennsylvania company's team from Moss Creek. Five teams also tied for the two-man event: Wound of right eye, compound fracture of forearm, compound fracture of knee cap with severe shock. Time allowed, 15 min. On the toss-up the same team won the prize, $5 in gold for each man on the team.

Five teams scored 100 per cent. each in the full-team event: Compound fracture of lower third of right thigh, compound fracture of left leg, compound fracture of right arm, bleeding in spurts from all wounds. Transport 20 ft. on an improvised stretcher. On working off the tie the Pennsylvania company's Hastings team and the Clearfield Bituminous No. 1 team again tied, but the former was finally victorious. Indeed the Hastings team had a perfect score in every test. The members of this team have worked together for several years and have won great renown. The prize was $5 in gold to each member of the team. This plan of giving money prizes is of questionable advantage. It places the contest on a professional basis and still further eliminates the right motive of the first-aid man—that of service to those in need or in distress. This motive should always be kept prominent.

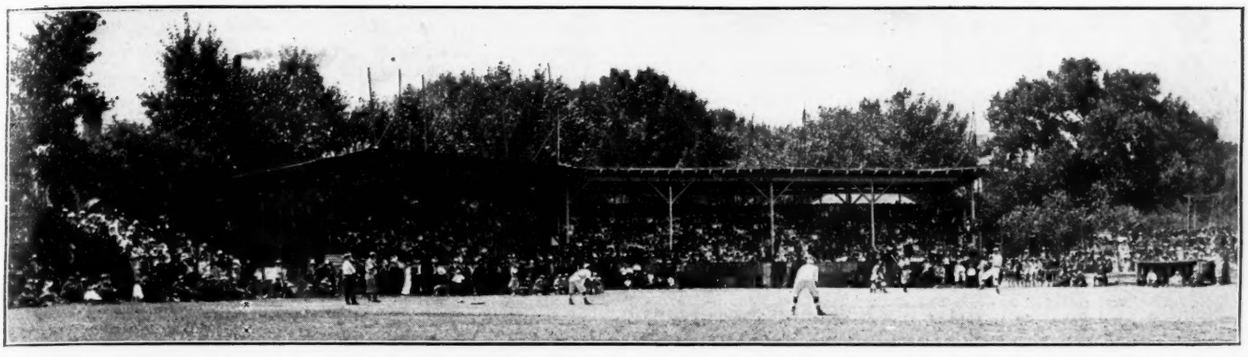
In the afternoon, after the park had been dedicated with suitable exercises, the mine-rescue contest was held. Two teams composed of one man from each of 10 mines in the vicinity were pitted against each other. Each team was required to enter a long shed which represented a mine 60 ft. long, constructed on the field and filled with smoke, to use its oxygen apparatus properly, to rescue one of its men who was supposedly overcome, to carry him out on a stretcher and resuscitate him by the Shaefer method. The judges of the Bureau of Mines awarded a money prize to each team, No. 1 securing first place. This was the first public demonstration of mine rescue in this district.

To demonstrate the explosibility of coal dust when exposed to an open light, finely ground coal was set in motion in the improvised mine and exploded by the flame from a small cannon. The effect was spectacular, but some were disappointed that no demonstration was made by the rescue corps at this time. This was deemed undesirable because of the danger to which the men would be exposed from any fire still remaining in the wooden structure or from the falling of timbers that had been loosened or broken by the violence of the explosion.

Trachoma, a Dangerous Eye Disease, readily and frequently transmitted through the medium of the common towel, has broken out in the mining camps of the Fairmont region. The men affected have been sent to the hospital at Welch, a special department for the treatment of the disease having been established there two years ago by the state and federal health services. Most of the cases hitherto have been found only in the southern part of the state. Recent advices are to the effect that provision has been made to take care of such cases nearer home.

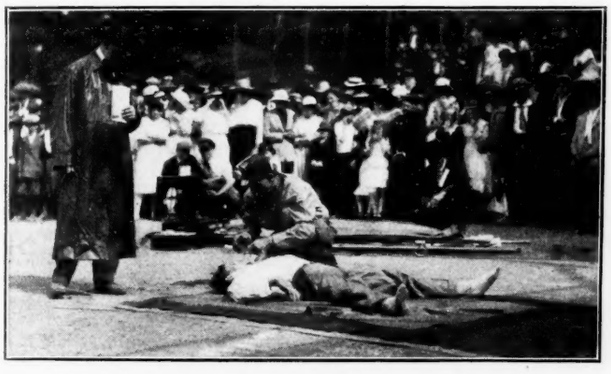
Mine Institute at Beryl, Mineral County, W. Va.—The mine workers at Beryl have established an organization for social enjoyment and mental advancement known by the name of the West Virginia Central Junction Mining Institute. The first meeting was held in the Presbyterian Church recently, when the charter members assembled for a dinner served by the ladies of the neighborhood. Seventy-eight mine workers and others were present. The leader in the formation of the Institute is Charles L. Fay, who is director of the safety and welfare department of the Davis Coal and Coke Co. The meeting was purely social with songs, talks, a clarinet solo and a monologue.

Annual Field Day of Colorado Fuel and Iron Co., 1916



BASEBALL GAME BETWEEN STARKVILLE AND WALSEN, THE CLIMAX OF THE LAS ANIMAS-HUERFANO SERIES

The mining villages of the two counties just named have held a series of contests culminating in the match between Starkville and Walsen, held in Trinidad, Aug. 26. In this Walsen beat Starkville by a score of 11 to 2. The baseball game between colored teams from Huerfano and Las Animas Counties was won by the Huerfano team

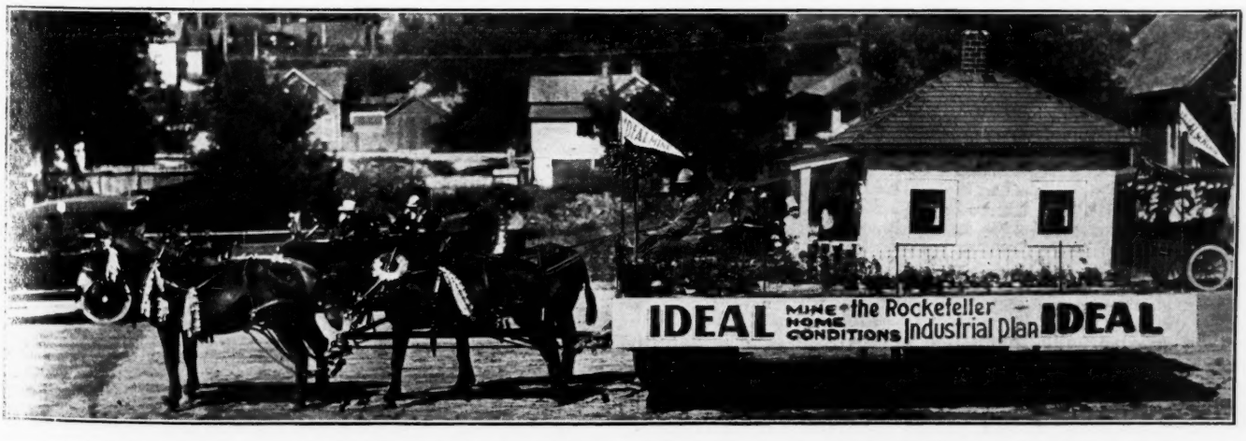


ROCKVALE WAS VICTOR IN FIRST-AID CONTEST

The Rockvale mine is in Fremont County near Cañon City, and, in thus winning, it secures the leading place for the Cañon group of mines

FIELD-DAY PARADE PASSING THROUGH TRINIDAD

The mine workers of the Ideal mine led by their mummers marching with flags up the main street of the principal city of Las Animas County



PARADE FLOAT OF THE IDEAL MINE WORKERS TO WHOM THE JUDGES AWARDED THE SECOND PRIZE

Practically every mine had a float, Sopris taking first place, Ideal second, and Rouse third. The Primero float proclaimed its village beauties; Starkville and Morley exhibited their happy children; Frederick heralded safety first; the Berwind-Tabasco mummers were in historic costume; Segundo had a model of its washery; Walsen announced "Industrial Representation Without Taxation"; while Sopris had a large basket of flowers, representing plenty, the flowers proving on inspection to be the heads and shoulders of the village's fairest citizenesses Photographs by Courtesy of C. F. & I. Bulletin.

Discussion by Readers

Shock to Motorman

Letter No. 1—Referring to the account of a motorman being shocked when operating a trolley locomotive, as given in *Coal Age,* Oct. 7, p. 613, I recall a similar experience of my own that occurred when I was operating a cable-and-reel gathering locomotive. In the case reported it was stated that the motorman was electrocuted when he attempted to throw the switch to start the machine and an explanation was asked.

The answer given to this inquiry claims that such a result would be possible only if the machine was defective. However, had there been anything wrong with the machine, it would have been discovered when they found the motorman dead. Attention is drawn to the fact that the starting switch is always inclosed. The switch on my motor is also inclosed, but it is possible to receive a shock by allowing one's fingers to come in contact with a live part if a motorman does not watch what he is doing when throwing the switch.

My own experience was as follows: I was operating, as stated, a gathering locomotive by means of a cable hooked to the trolley wire. My cable was on and, as I got back to the wire, according to my regular custom, I raised the pole and reached to move the switch while the locomotive was still running, after unhooking the cable. The shock I received from the 250-volt circuit did not electrocute me, but has caused me to remember in the future not to attempt to move the switch without looking. Probably the motorman who was electrocuted was using a 500-volt circuit. MOTORMAN No. 2.

Leckrone, Penn.

Gasoline Motors in Mines

Letter No. 4—Experience has clearly proved that the fumes from an internal combustion engine may be poisonous, and one of the greatest dangers from this source is that asphyxia, and death, may overtake one without warning. This danger exists above ground where there is, relatively speaking, ample air supply. Below the earth's surface it is a more serious matter, and the use of the gasoline engine is contraindicated except under circumstances of favorable ventilation.

The criterion of service is, of course, the cost per ton. The cost of the gasoline engine compared with the electric motor must include the cost of supplying the electrical energy, cost of maintenance, interest upon the investment, depreciation, insurance, etc., in both cases. What are the relative costs for operating an electric and a gasoline engine for locomotive service or any other subterranean purpose? It is not the cost for one day or so that is of primal importance, but the cost extended over a year or more, so that the expense of reserve capacity, replacements, delays, emergency labor, etc., may be included.

The operating costs of the gasoline locomotive usually increase after the first year, unless the maintenance charges are exceptionally high. Many of the large transportation and express companies using gasoline trucks are now resorting to electric vehicles because the skilled labor necessary to keep the gasoline engine in order, the high cost of maintenance due to the vibration and rapid deterioration result in exorbitant operating charges. In mines the service is more severe because of the dirt, dust, grade of labor available and the failure to execute repairs until necessary. Under these circumstances one would suppose that the gasoline engine would have a short life.

Granted that the gasoline engine has the advantage from an economic viewpoint, is this the only matter to be considered? It is known that the fumes from the gasoline engine may be dangerous, and that this danger may exist without its presence being known. There is the possibility of men being asphyxiated; there is the possibility of explosions occurring; there is always present the probable injurious effects of the gas resulting from incomplete combustion, doing its work insidiously and silently.

Of course, there are mines and mines and in many instances ample ventilation exists and the contamination of the air is so slight that it need not be given serious consideration. In other mines it is a very different tale.

The safety feature prevents the gasoline engine being used in many cases, as does also the high cost of maintenance and the grade of labor required to operate the machine. The overload capacity of the gasoline engine is more limited than is that of the electric motor, which reaches its limit only at destruction. Another factor that should be remembered is that the cost of gasoline is high, and deliveries are furthermore somewhat erratic. The cost of electrical energy is in strong contrast to this, since it is getting lower year by year, as well as more reliable. An estimate of the cost of electrical energy may be made within close limits, whereas for gasoline it is impossible to tell what the cost will be one year hence, or how much can be obtained at the price.

Chicago, Ill. KAPPA.

Springs on Mine Locomotives

Letter No. 5—The recent articles on mine haulage, the operation of gasoline versus electrically propelled cars, the rating of electric motors for mining locomotives and the variation of performance of cars with and without springs are full of interest and value from the commercial as well as the technical aspect. It has been said that a little knowledge is a dangerous thing, but the man who knows the most about the apparatus he operates or purchases is the man who will get the best results. With this excuse for adding a little to what has already been said, permit me to refer to Motorman's query as to why three different locomotives behave differently under the same load conditions. Although this inquiry has been discussed from several viewpoints, I shall endeavor to express the same things in a different way.

That the locomotive having the least weight and yet able to exert the greatest tractive effort has no springs,

while the other two are spring-mounted, does not indicate that springs are a hindrance. Indeed, the reverse of that is actually the case. Spring suspension is highly desirable for locomotives, because they lengthen the life of the locomotive and of the track and tend to reduce accidents. It is important that a locomotive be capable of riding over the track smoothly and with little variation in the distribution of the weight upon the individual drivers. But, unfortunately, the tracks in many mines are notoriously bad and more damage results at the high spots if the weight of the locomotive is concentrated on one set of wheels. Vibration also enters the machine and increases the cost of upkeep, especially of gasoline-propelled cars.

Effect of Steel or Cast-Iron Tires

As has been remarked by others, the difference in the performance of locomotives with and without springs is not due to the springs but to the interconnection of the wheels in the one machine, and its absence in the others. Another reason for the better showing of this locomotive is that it may be equipped with steel-tired wheels while the other two locomotives have cast-iron wheels. The maximum tractive effort possible for a locomotive of definite weight depends on the adhesion of the wheels to the rails. In designing a locomotive a weight is chosen that will suffice for the maximum acceleration, or grade, and for a definite adhesion.

The adhesion of cast-iron wheels is less than that of wheels with steel tires, for the same weight of locomotive. When cast-iron wheels are used it is customary to allow a drawbar pull equivalent to 20 per cent. of the weight of the locomotive, on clean dry rails. Where wheels with steel tires are used it is common to allow a drawbar pull equivalent to 25 per cent. of the weight resting on the drivers, because wheels with steel tires have a stronger hold or bite the rail better. It is often convenient to design a locomotive with sufficient weight for fairly severe service and then resort to the use of sand over one specially severe portion of the track. This results in a lighter locomotive and lower operating costs than would be possible otherwise. When sand is used the equivalent drawbar pull with cast-iron wheels is taken at from 25 to 30 per cent., while with steel-tired wheels it may be from 30 to 33 per cent.

With these values for the coefficient of adhesion it is seen that the locomotive with cast-iron wheels must have a weight five times that of the drawbar pull, whereas one with steel tires requires a weight but four times that of the drawbar pull. If the single-type Goodman locomotive mentioned has wheels with steel tires, this fact alone is sufficient to explain its better performance than the heavier double-type locomotives with cast-iron wheels.

Single- vs. Double-Type Locomotives

Attention has already been drawn to the difference in the weight transfer of the single- and double-type machines. The Goodman single-type car has both axles driven by one motor, whereas the other two cars are each equipped with two motors driving the two axles, each motor working independently of the other. It is the independence of these two sets of drivers that is responsible for the lower tractive effort of double-type locomotives.

It is well known by those who have designed, tested or operated locomotives in an attentive way that, under conditions of maximum tractive effort, one pair of drivers will slip before the other. Which pair will slip first will generally depend on the direction of travel of the locomotive. The slipping of one set of drivers results at once in a loss of tractive effort, and for the same load hauled the locomotive with one set of drivers slipping will require an increase of weight. This subject is especially interesting to anyone concerned with haulage problems, and the following general explanation as to why this occurs may prove useful:

Effect of Drawbar Pull on Tractive Power

Assume a locomotive at rest exerts a tractive effort T to start a loaded trip. The resistance of the trip to motion causes a drawbar pull P, which will be less than the tractive effort of the locomotive by an amount required to overcome the internal friction of the motor and the track resistance of the locomotive itself. But the tractive effort of the locomotive is limited in its effect by the adhesion of the wheels to the rails.

There are thus three forces in action at the moment of starting a loaded trip; namely, the weight of the locomotive acting vertically through its center of gravity, the tractive effect acting in the direction of motion along the rail, and the drawbar pull acting in a parallel but opposite direction at the height of the drawbar above the rail. The two last-named forces form a couple that tends to rotate the locomotive about the rear axle as a center, this rotation being opposed by the weight of the locomotive acting downward through its center of gravity at a point somewhere between the two axles. The result is a tendency to lift the front end of the locomotive, which to that extent decreases the adhesion of the front wheels to the rails.

Assuming a level track, and the movement of the locomotive always in the same direction, it would be possible to so distribute the weight of the machine as to overcome this lifting tendency due to the drawbar pull and equalize the adhesion of all four wheels to the rails. This, however, is practically out of the question since the locomotive must operate in either direction and cannot always run on a level track. Moreover, the load hauled is not uniform, and the drawbar pull would exert a greater lifting tendency when hauling a heavier load than when pulling a lighter trip. There is also a variation in the weight transfer when acceleration of the load is taking place.

This, I believe, explains very simply why one set of wheels starts to slip before the other, and why the total tractive effect, for the same weight of locomotive, is less in the double-type than in the single-type machine, the drivers in the former case being operated independently, while in the latter case they are interconnected. It is possible to overcome the disadvantages of the double-type machine arising from this cause by connecting the axles together by side rods, as in steam-locomotive practice. This method has also been applied in some instances to mine locomotives with good results.

I would suggest that another way of overcoming the difficulty would be to vary the input to the motors of a double-type machine, reducing the current delivered to the front motor so as to proportion its torque to the adhesion of the front wheels to the rails. This will, at least, reduce the tendency of those wheels to slip. To accomplish this, the current supplied to the two motors should be adjusted until both wheels slip together. However, the necessary adjustment will vary with the weight transfer that occurs on different grades of track and with

the varied performance of the machine. The better plan is to make the whole machine a rotative unit by means of the side connecting bars previously mentioned.

Chicago, Ill. K. RANKIN.

Shortage of Labor in Mining

Letter No. 6—This country is not the only one suffering from a labor shortage. All the industrial countries of Europe have been in the same predicament for a number of years. Strange as it may seem, such thickly populated countries as Westphalia, northern France and Belgium, are those that were suffering most when the war began. This was caused primarily by the extraordinary increase of industrial activity.

Another cause was the general tendency all over western Europe to shorten the hours of labor. Where men used to work twelve or ten hours a day, they now work only eight or nine. In Belgium a law was enacted limiting the working day in the mines to eight hours. Conditions were such, even ten years ago, that French, Belgian and German employers of labor began to draw large numbers of men from northern Italy, Austro-Hungary, Poland and Lithuania, reducing emigration to America.

It has been estimated by European statisticians that the large emigration of working men to America, in 1907, would have been at least 30 per cent. greater had not the European labor market been influenced by the new working conditions and high wages that were then beginning to rule over industrial Europe. Then came the panic of 1908, which caused so many foreign workers to return home. Very few of these ever came back to America. Their transatlantic experience and contact with an advanced civilization had so developed their intelligence, broadened their views and increased their working capacity that they had no trouble at all in securing steady employment in the old country at wages comparing favorably with those in America.

A few months before the war, I had occasion to inspect an important mining district of northern France where I found, working about the coke ovens and in the mines, several hundred Italians, Slavs and Croats, who had worked in the United States before the panic. They were all contented with their situation and wages. A little later, I spent two days in the new coal field of Limbourg, in northern Belgium, where I found a whole village of 174 brand-new brick houses inhabited by an equal number of Polish families. Among these were 97 men, 89 married women and an incredible number of children who had lived in America but had left there at the time of the last panic. The same conditions were found to exist in the Ruhr district and the Saar region of Germany.

Fifteen years ago, had a Belgian, Frenchman or German ventured to express the opinion that his country some day might be compelled to employ foreign labor, he would have run the risk of being sent before a lunacy commission. Considering how greatly the demand for workers has increased in Europe during the last ten years, the labor shortage of which American mines are now complaining is not surprising in the least. That the end of the war will bring any relief to the situation is not probable. Europe will now, more than ever, need all its men to reconstruct its industries and commerce. In order to accomplish this work with a population decimated by the war, high wages will have to be paid. The men will have every reason possible to stay home instead of emigrating. It is even to be feared that many thousands of men of foreign origin, now working in the mines in America, will be attracted by the wages paid in Europe and recross the Atlantic. Thus, the end of the war, instead of improving the labor situation in the mining regions of the United States, will make it worse.

EMMANUEL DUFRANNE,
Charleston, W. Va., Engineer of Mines.

Improving the Coal Industry

Letter No. 4—In reading the letters that appeared in *Coal Age*, Sept. 23, pp. 505-507, suggesting methods of improving the coal industry, it seemed to me that William Crooks offered the best solution of this question.

Mr. Crooks suggests the establishment of "a selling bureau to which all operators will turn over their production." I wonder why coal cannot be sold through a coal exchange, in the same manner as grain. The grain of the United States has long been bought and sold through the Chicago exchange, where the price is quoted daily. In the same manner the coal operators of the United States could establish a central coal exchange where all the buyers of coal could send their orders and specifications of the kind of coal they required.

By some such arrangement, coal could be shipped from the nearest supply point direct to the consumer on an order placed by the exchange. This would effect a great saving in transportation charges and eliminate the extra expense of special agents and middlemen. The cost of conducting such an exchange would be met by a fraction of a cent per ton paid by both buyer and seller. It seems to me that this suggestion is well worthy of consideration and discussion. I was much interested in the many good suggestions made in answer to this inquiry.

Adamsburg, Penn. NELS G. BOLLING.

[In connection with the suggestion of Mr. Bolling, the article of J. F. K. Brown, on the "Difficulties of Organizing Sales Combines" in this issue of *Coal Age*, p. 712, will be read with interest, and we hope the matter will be discussed.—Editor.]

Letter No. 5—Nothing is more needed to demonstrate the welter and chaos prevailing in some branches of the coal industry than the various opinions evoked by the competition contest, relating to the improvement of the coal industry, *Coal Age*, Sept. 23, pp. 505-507.

This varied correspondence appears to be the outcry of men who keenly realize their predicament and are vainly striving to grope their way out of their difficulties. Labor shortage, union tyranny, increasing cost of production, close competition in the market, and diminishing dividends all manifest themselves as pressing evils.

Among the many valuable suggestions submitted, however, I would hesitate to award the palm to the "bonus-system" idea suggested by W. H. Noone, whose letter was deemed to contain the most valuable suggestion that was made looking to the improvement of the coal industry. Although the bonus system has been adopted in many industries with spectacular success, in my opinion it does not seem to be at all adapted to coal mining.

A condition that is indispensable to the success of the bonus system is a reasonable uniformity in all that affects

labor. Where it is possible to control and regulate these conditions, as it is in many industries, the plan seems to be the logical expedient to adopt, or I may say an economic necessity. However, in an industry where the conditions are as variable and incapable of regulation as they naturally are in coal mining, the bonus system if applied will generally prove a misfit. Its adoption will only aggravate and increase the inequalities existing between different classes of labor in the mines, as men will not have the same opportunities of availing themselves of what the system offers. It is rare indeed that any two classes of labor, in the enterprise of coal mining, present opportunities that are anything like parallel.

Frequently, the really efficient workman must perform his task under conditions that seriously and persistently handicap the results of his labors, while a lucky "boob," by reason of conditions that are in no way uncommon to this industry and with no great effort of his own or capacity for work, is able to secure large returns by the bonus system, which he is not slow to recognize, availing himself of the advantages offered. Under such conditions it must be clear that the bonus system would put a premium on certain classes of labor rather than on the effort and efficiency of the worker, upon which the general success of any undertaking chiefly depends.

Let me say, in closing, that in order to be ideal or even measurably just to the workmen, the bonus system can only be applied to conditions that are sufficiently uniform to make the capability, honesty, faithfulness and efficiency of the worker the determining factors in the results of his labors.

J. R. ALLARDYCE.

Saginaw, Mich.

Coal-Mining Examinations

Letter No. 3—In connection with the subject of coal-mining examinations, permit me to relate a little of my recent experience, which I hope may be of some value to others who may find themselves in the same position in which I was placed at that time.

Finding myself, not long ago, on the list of unemployed, which will occur at some period of almost every man's life, I made a vigorous effort to secure a position in mining either in the State of Colorado, where I was then located, or elsewhere. I filed my application with several large coal companies in different places—among them one of the largest companies operating in Colorado. My application with this company resulted in their making me an offer of the position of fireboss at a salary of $115 per month, which I accepted, being particularly anxious to get started in the Colorado coal field that had impressed me favorably on former visits.

The position accepted was that of fireboss at the Delagua mine of the Victor-American Fuel Co. This is one of the largest mines in the state. Although I did not hold a fireboss' certificate issued by the Colorado examining board, and the state law which went into effect Jan. 1, 1914, compelled mine operators to employ only certificated mine foremen, assistant foremen, firebosses and other underground officials, still I was permitted to act in the capacity of fireboss until the next examination was held, which would be in about two months.

When the time arrived, I presented myself before the board for examination. I had, in the meantime, been studying the coal-mining laws of Colorado and knew that one of the requirements of candidates for a certificate of competency was that the candidate should have been employed in underground positions in the mines of Colorado for two years prior to the examination. I mentioned this fact to the secretary of the board and explained to him that I had been a resident in the state but a short time previous to the examination, having performed the work of fireboss at the Delagua mine during the past two months.

In reply to my statements I was told by the secretary of the board that I could sit in the examination and, if I was successful in passing the same, they would see what could be done in my case. In justice to the board, I want to say that they made no promises. The examination was very practical and by no means difficult for me, as I had previously passed three examinations—one for mine foreman and two for mine manager.

Successful Candidate Refused Certificate

As a result of the examination I received a letter from the secretary of the examining board, stating that I had passed a very creditable examination in everything, both written and oral, but adding that the board was unable to grant me a certificate because I had not the length of residence in the state that was required by law. I hoped, however, to be permitted to continue in my present position until successful in finding another place. But these hopes were not realized.

A short time later, I was called to the office, where the superintendent read me a letter just received from the chief mine inspector of the state, saying that on and after a certain date, every official engaged at the mine must have his certificate posted up in the office of the company for inspection. This forced me to tender my resignation as fireboss, and, although the superintendent assured me my services had been very satisfactory and offered me any other class of work around the mine, I decided to leave the state, as I could not afford to work for two years as a miner in order to qualify myself for an official position.

In submitting my statement to the board, previous to the examination, I had shown an experience of 28 years in coal mines that were chiefly gaseous, having held an official position for the past 18 years and serving in capacities from fireboss to mine manager. The superintendent stated to me that he did not favor the law requiring a two years' residence in the state before a candidate could secure a certificate.

Is a Law Requiring Long Residence of a Candidate in a State Just?

Although I suffered a large pecuniary loss through moving my family to Colorado, I am not writing this in any spirit of ill will or resentment. I believe it is a fair question to discuss in *Coal Age,* whether such a law as the one I have mentioned can be considered just and fair to a mining man who has probably worked nearly three-fourths of his life in coal mines where the conditions are as dangerous and as difficult to handle as those existing in any mines in the state from which he is barred by such law.

I hope readers of *Coal Age* will express their opinions freely on this matter. For myself, I claim to be fair-minded and realize that we must all conform to the requirements of the different state laws. Nevertheless,

I cannot help but feel that such a law as this has only been enacted to benefit a certain class. Its effect undoubtedly is to keep a large number of practical mining men from going to Colorado from another state. Many of these men may be far better qualified than some of those holding such positions within the state. Whether the law was advocated by the labor element or not, I cannot say, but if such was its source, it is not a fair deal to a brother who has worked in the mines since he was 11 years old, but is now debarred because he comes from another state. J. W. P.

South Bethlehem, Penn.

Certification of Mine Foremen

Letter No. 7—The recent amendment to the mining law of Pennsylvania, in connection with the enactment of the new Compensation Law, presents two main features for discussion; namely, the benefit accruing to coal operators in the state and the retarding effect on the ambition and general efficiency of the workmen.

No one will question the motives that actuated the men interested in the passage of the compensation law; but many will be found, among those who realize the great uplift to the coal-mining industry that has resulted in recent years through the education of the working classes, who will seriously question the motive that prompted the amendment to the state mining law, which in the opinion of many has practically rendered portions of that law inoperative.

The extremely hazardous nature of coal mining operations previous to 1885 had so interested the general public that the need of governmental supervision of mines was clearly seen. It was then that the state law was enacted requiring the certification of mine foremen and firebosses. The wisdom of this enactment has been clearly shown by the gradual reduction of the fatal-accident rate in Pennsylvania mines from that time to the present.

Right of Coal Operators To Choose Their Men

A broad-minded person will readily grant that coal operators are justified in demanding an equitable recognition of their rights, and certain concessions may be due them by reason of the enactment of the compensation law by which they are burdened with the direct taxation resulting from accidents in the mines in their charge. The law is very specific and does not exonerate the operator from liability for accident to an employee, even through the claim of "contributory negligence." By the terms of the compensation law, an operator who elects to work under the provisions of that law must pay the full compensation specified in the act, without respect to any contributory causes that formerly enabled him to escape liability for many accidents due to the negligence or carelessness of workmen.

In face of these facts the claim would appear reasonable that the operator should be given the right to choose whom he shall place in charge of his mine. He argues that the employment of a certified official does not lessen his liability under the compensation act and asks, Why should the operator be compelled to employ a certified man, which naturally limits his choice and, to an extent, his judgment of the ability of the man to meet his needs?

Rightly or wrongly, most operators regard their business as exclusively their own, and, within certain limitations, subject to their control. They are prone to regard the paid worker as having only a superficial interest in their affairs, quite different from the vital interest of the operator whose money is invested in the undertaking. Owing to this difference of interests, vital and superficial, the latter varying with the individual faithfulness and integrity of the worker, the operator claims the right of choice without dictation. On the other hand, the old mining law (1885) limited this choice of the operator to a class of certified men, whose ability had been tested by rigid state examinations, to pass which required a large degree of technical as well as practical knowledge of mining work and experience.

The unprejudiced mind naturally feels that operators are actuated chiefly by the desire of freedom of choice. In my opinion while a few would discriminate in favor of uncertified men, the large majority of coal men have learned to appreciate the value of certified men in the operation of coal mines. These latter will not exercise the privilege accorded them in the new act, by the employment of uncertified men.

How the Law Discriminates Unjustly

There is another feature of the amendment, however, that makes an important discrimination in favor of uncertified men. This lies in the fact that these men are not amenable to the law in the same sense as the certified men, who are at once deprived of their papers when guilty of a violation of the mining laws. In this respect the amended law is paradoxical, being both operative and inoperative. As I have previously mentioned, the amendment is not only inconsistent with certain features of the law that are thereby rendered null and void, but it discriminates between these two classes of men in a manner that is unjust. One may well question and study the motive that prompted this amendment to the old law.

In its relation to the compensation law, coal mining seems to occupy an anomalous position among other industries, none of which has been affected in the same way by its passage. While one may question the financial benefit to the operator, growing out of the amendment, there is no doubt but that they will enjoy the freedom from governmental control that they sought to obtain.

Ineffectual Plan of Taxation

The burden of taxation for liability under the compensation act appears to have been wrongly placed on the operator, or producer, who is in a position to transfer this burden to the consumer, by raising the price of his commodities. This would appear to be an act of injustice and discriminates in favor of the producer as opposed to the consumer. I want to ask, Would it not have been more equitable to have made the tax for the compensation of injury to workmen a public charge that would have rested on the producer as well as on the consumer?

In closing permit me to say that the ambitious worker who would be discouraged from further study of mining methods and conditions, by reason of the amended law, does not hold the highest regard for the work in which he is engaged. A thorough knowledge of this work should be of intrinsic value to every worker, whose integrity may be questioned if he allows himself to be influenced by existing conditions and measures his capability by a material standard that would limit his efficiency.

Windber, Penn. A. M. Iner.

Inquiries of General Interest

Fan Ventilation at Shaft Mine

The air shaft in an Iowa mine is 10 ft. by 5 ft. 5 in. in size, with a partition in the center of it consisting of 4x6-in. buntons, which are spaced about 1½ ft. apart, except at one point in the shaft where they are solid. The fan sets over one end of the air shaft so that it discharges the air down that one side.

The theory has been advanced that if this partition is boarded up tight all the way down, except for about 6 ft. at the top where, it is claimed, the buntons should be taken out altogether, a larger quantity of air will be circulated by the same power. The fan at present is delivering approximately 80,000 cu.ft. of air per minute.

Fearing that this would be contrary to the laws of ventilation, I made a personal examination and found that the velocity in the section of the shaft over which the fan is setting is four times as great as the velocity on the other side of the shaft.

Also I would be pleased to know what effect, if any, would be produced on the air by building a V-shaped place out of boards, at the bottom of the air shaft, so as to divide the air as it comes down the shaft and passes into the mine. This partition would be built on a curve, so as to destroy the eddy currents that naturally arise at the bottom of the shaft.

Any information you can give in regard to this through *Coal Age* or its readers will be greatly appreciated.

D. D. WILCOX,
Assistant Superintendent, Superior Coal Co.
Gillespie, Ill.

In reply to this inquiry as to whether boarding up the buntons in the air shaft, under the conditions described, we will say that we would not advise doing this, for the reason that the slight interference with the air travel in the shaft, due to the spacing of the buntons, 18 in. apart, is probably more than counterbalanced by the open space afforded for the passage of the air current down the shaft.

Had a sketch been sent showing the actual position of the fan, which is said to set over one end of the shaft, and the connection of the spiral casing with the top of the shaft, we would have been better able to judge of the conditions. From the description given, we assume that the top of the shaft is boarded over with planks or staging extending from the spiral casing to the opposite end of the shaft. If that is true, there is formed a large dead space in the top of the shaft just under the staging and, as a result, the air current will eddy around in this space instead of passing directly down the shaft.

There is always a loss of power where a fan drift or conduit suddenly expands or opens out into a large space, which in this case occupies the entire sectional area of the shaft. The expansion should be uniform, and we would suggest that better results might obtain by extending the shaft casing on a uniform line down the shaft till it reaches the opposite end of the shaft, thereby providing a uniform expansion of sectional area and producing a gradual reduction in the velocity of the air current without giving opportunity for the formation of eddies and consequent loss of power.

In regard to building a "V-shaped" brattice, or partition, at the foot of the downcast shaft for the purpose of dividing the current passing into the mine in opposite directions, we answer that there is always an advantage in deflecting an air current in this manner by a brattice presenting a uniformly curved surface, so that the air current will not impinge directly against a flat surface more or less at right angles to the direction of the current. In doing this, however, one should avoid reducing the sectional area or area of passage of the current.

Choice of Power in Operation of a Shaft Mine

In reading various articles in technical mining publications, I find quite a difference of opinion expressed in regard to the adaptation of different kinds of power to the economical operation of a mine. Will *Coal Age* kindly explain what are the relative advantages and disadvantages in the use of steam, compressed air and electricity in the operation of a shaft mine, with the greatest degree of safety and economy, under different conditions, with due regard to cost. SUPERINTENDENT.

Pittsburgh, Penn.

In mining practice, electricity possesses a considerable advantage as compared with either steam or compressed air, in respect to the transmission of power. For the purposes of hoisting only, steam power is the most common in use and has the advantage of greater simplicity in its generation and the equipment required. The use of steam power in mines, for any purpose whatsoever, is always attended with the annoyance of getting rid of the exhaust steam, which often produces a harmful effect on the roof strata. Its only advantage is the increased humidity of the mine air, due to the presence of the steam.

Compressed air has the advantage of supplying a certain amount of pure air in the mine workings. In respect to the transmission of power, the cost of installation and upkeep of a compressed-air pipe system exceeds that of the wiring and rail bonding required in the use of electrical power, and the former system is not so elastic in its adaptation to the changing conditions in the mine as an electrical installation.

The disadvantage of an electrical installation lies chiefly in the danger of contact of men and animals with live wires, and the ignition of gas when present, by the sparking of wires, blowing out of fuses, short-circuiting of the current, or defective switches. Either electrical or compressed-air installations require more expert and careful attention than steam, but this requirement is far overbalanced by the advantages of the system.

Examination Questions

British Columbia Examination, First Class, May 30, 1916

(Questions Answered by Request)

Ques.—What are the most approved methods of avoiding serious accidents in the event of an overwind?

Ans.—The consequences of an overwind occurring when hoisting men in a shaft are so serious that every possible precaution must be taken to avoid its taking place. For this purpose it was formerly common practice to mark the hoisting rope with white paint, in such a manner as to attract the engineer's attention in sufficient time to shut off the steam and apply the brakes to bring the cage to rest at the upper landing. Indicators were also used to a large extent; but many serious accidents occurring in the use of these methods, more efficient means have been adopted. The most approved appliance for the prevention of overwinding is an arrangement that is automatic. The ascending cage, striking a lever fixed in the shaft at a suitable distance below the landing, operates to shut off the steam and apply the brake to the winding drum. The chief objection urged against all overwinding devices is that they have a tendency to render the engineer less careful and observant and any failure of the mechanism would cause a most serious accident.

Ques.—What will be the length of a drift between two seams, the floors of which are 20 yd. apart, when the strata are dipping 3 in. per yd. and the drift rising 1½ in. per yd.?

Ans.—A dip of 3 in. per yd. is equivalent to 3 in 36, or 1 in 12, and a dip of 1½ in. per yd. is equivalent to 1½ in 36, or 1 in 24. Hence, calculating the angles of inclination of the seam and of the drift, respectively, assuming that the former dips 1 ft. vertical in 12 ft. horizontal and the latter rises 1 ft. vertical in 24 ft. horizontal distance, the tangent of the dip angle of the seam is $1 \div 12 = 0.0833$, which corresponds to an angle of 4° 46′; and, likewise, the tangent of the rise angle of the drift is $1 \div 24 = 0.04167$, which corresponds to angle of 2° 23′. The angle between the slope and the drift is then equal to the sum of these two angles, or 7° 09′. Finally, the perpendicular distance between the two seams being 60 ft., the length of drift measured from floor to floor of the two seams is $60 \div \sin 7° 09' = 60 \div 0.12447 = 482$ ft.

Ques.—(a) What should be the size of the cylinders of a duplex hoisting engine, which performs 36,000 ft.-lb. of work per revolution, if it is supplied with steam at 40 lb. m.e.p., the stroke being 2½ times the diameter of the cylinder? (b) What is the least turning moment this engine will exert?

Ans.—(a) The work performed per revolution is given by the formula

$$u = 2pal$$

in which u equals work per revolution (ft.-lb.), p equals mean effective pressure of steam (lb. per sq.in.), a equals sectional area of cylinder (sq.in.), l equals length of stroke (in.). Substituting the given values in this formula, assuming that the work of a single cylinder per revolution is 18,000 ft.-lb.,

$$18{,}000 = 2 \times 40(0.7854d^2)2.5d = 157.08d^3$$

$$d = \sqrt[3]{\frac{18{,}000}{157.08}} = 4.85, \textit{ say } 4\tfrac{7}{8} \textit{ in.}$$

It would be well to estimate the size of this duplex engine as 5x12½ in.

(b) The least turning moment of a duplex engine, with the two cranks set at right angles to each other, will occur when one of the cranks is on dead center when its turning moment is zero. Without going into a technical analysis of the question and not knowing, in this instance, the ratio of the length of crank arm to that of the connecting-rod, it may be assumed that the least turning moment of the engine is equal to the total cylinder pressure, in pounds, multiplied by the length of the crank arm or one-half the stroke of the engine, in feet. In this case, the half-stroke, in feet, is $\frac{1}{2}(12.5 \div 12) = 0.52$ ft. Also, the total steam pressure in one cylinder when the piston is at the middle of its stroke can only be assumed approximately from the mean effective pressure, since the point of cutoff is not given. For a two-thirds cutoff in a slide-valve engine, however, the initial steam pressure in the cylinder, corresponding to a mean effective pressure of 40 lb., is approximately 67 lb. per sq.in. The total cylinder pressure at center stroke is then $67(0.7854 \times 4.875^2) = 1{,}250$ lb. On this basis, the least turning moment would be $1{,}250 \times 0.52 = 650$ ft.-lb.

Ques.—What is meant by the efficiency of an air compressor? State what are the losses that may occur when compressed air is used, and what means should be adopted to reduce these losses as far as possible.

Ans.—What is called the "volumetric efficiency" of an air compressor is the ratio of the volume of free air required to produce a given pressure by its compression, to the piston displacement of the compressor cylinder. Owing to leakage of air past the piston and clearance spaces in the cylinder and valve ducts, the actual piston displacement is always greater than the theoretical volume required to produce the given pressure. Volumetric efficiency depends alike on the gage pressure, absolute pressure and the perfection of the machine. The mechanical efficiency of an air compressor is the ratio of the power stored in the compressed air to the power consumed in compressing the air. The efficiency is less at elevations above sea level than at sea level, owing to the necessity of compressing a larger volume of free air to cause an equal gage pressure at such altitude.

The principal losses that are experienced in the use of compressed air arise from the cooling of the air after compression. When air is compressed heat is generated and the temperature of air rises. The loss of this heat by radiation, in transmission, means a drop in pressure and loss of power. To avoid this loss, compression must be effected without rise of temperature or the air must be reheated at the point where the power is used.

Coal and Coke News

Washington, D. C.

Dismissing the complaint of the Coal Operators' Traffic Bureau of St. Louis, Mo., against the Baltimore & Ohio Southwestern and other railroads, the Interstate Commerce Commission recently entered a decision of far-reaching importance in the rate world. In this connection the Commission held that the roads have charged proper rates on bituminous coal from Group 2 points in Illinois to St. Louis from Aug. 3, 1915, to Oct. 1, of the same year. It appears that a rate of 52c. was first quoted in 1912, later the rate of 57.5c. being applied. This latter rate, however, was contained in tariff supplements suspended by the Commission in a general coal investigation.

The Commission pointed out:

"We have not overlooked the fact that practice of the respondent carriers in this matter was not in strict accord with the Commission's tariff rule, which requires that a tariff reissuing rates during a period of suspension shall be canceled if the suspended tariff subsequently becomes effective. Had this rule been observed, the present dispute would not have arisen. The failure may have had the effect of making lawfully applicable a rate different from that which had been inoperative by virtue of orders of the Commission and voluntary postponements of the carriers made at the Commission's request. In other words, the legal rate must be determined from an interpretation of the tariffs actually published. We do not find that the failure to cancel supplement No. 31 had the effect of continuing the rate of 52c. in force, for that supplement must be construed in connection with supplement 30.

The interpretation here given to these tariff publications is in no wise dependent upon the equities of the situation nor can it be claimed that the shippers have been misled. The rate of 57.5c. was originally published to become effective Apr. 1, 1913. It is not denied that shippers represented by this complainant protested against the increase and were parties to the investigation. They were familiar with the issues and knew that the operation of the rate of 57.5c. was suspended pending the results of that investigation. They were advised by the carriers in every tariff supplement that the increased rate was under suspension. They were not required to pay the increased rate until Feb. 1, 1915, a year subsequent to the expiration date of the Commission's second order of suspension."

An amendment to its original decision has been entered by the Interstate Commerce Commission in the case of the Stonega Coke and Coal Co. against the Louisville & Nashville and other railroads. This case involved other proceedings as well, into the rates on coal and coke from Virginia mines. The amendment read:

"As stated in the original report in this case at p. 25, 'the conditions of transportation are substantially the same between the two fields.' The peculiar construction of the mine tipple tracks prevailing in the St. Charles district is claimed to make the operations in that district easier than the operations in the Stonega district, but this difference is not reflected in the cost of service for the two districts, which will be discussed hereinafter. The finding of discrimination relates only to coal, and the operating costs of the Louisville & Nashville in the St. Charles district are not pertinent with regard to what the divisions on coke should be. In fixing the divisions on coke, however, the Interstate R.R. should be compensated out of the through rates established only for such services as its common carrier duties require. It appears that this coke traffic involves extra switching at the furnaces. This, however, is not intended to be compensated for by the divisions herein prescribed. Except as to the furnace switching there is no further appreciable difference between the coal and coke traffic to the Stonega district except the greater detention of coke cars."

HARRISBURG, PENN.

Because the present immigration laws are inadequate, District Attorney F. A. Slattery and Sheriff George F. Buss, have failed in their efforts to have alien members of the I. W. W., who terrorized the upper end of Luzerne and Lackawanna Counties, deported. They have been informed that there is no law under which the rioters or dynamiters of coal properties can be sent out of the country.

This decision was made by the office of the Commissioner of Labor at Washington, D. C., after an investigation and report by an immigration inspector of conditions in the anthracite region. The decision has been known for some little time by the county officials, but they delayed in making it public until after the disorders had subsided.

The Luzerne and Lackawanna County officials took up the matter of deporting the undesirable aliens who have been causing so much trouble at the coal mines, with E. M. Greenawalt, Commissioner of Immigration, at Glocester, N. J., last September, following I. W. W. disorders, and the latter sent inspector C. C. Reiss to investigate. The inspector made a thorough investigation and examined state troopers, police officers and deputy sheriffs, and also attended some I. W. W. meetings. He filed a report recommending that the guilty aliens be deported as undesirables.

The report was forwarded to Washington, but the ruling of the department was that the present law does not cover the case, that only those guilty of white slavery or those known to be liable to become public charges at the time of entry could be deported.

It was stated, that had the new immigration bill, known as the literacy test, been passed by the last Congress, the lawless rioters could have been deported as undesirables. This law would bar all who advocate or teach anarchy or the unlawful destruction of property, and would extend for a period of five years from the time the alien arrived in the country.

Claims May Be Met by Prosecutions

Coal company officials are considering fighting some claims for compensation as advanced by injured men and instituting instead prosecution for violation of the mining laws. Pursuance of the plan as outlined by these officials would operate for a safer condition in the mines and prevent some of the accidents that have been due to recklessness on the part of the mine workers.

It is claimed that in some places men have been burned by explosions of gas after having been ordered to remain out of their places of work, yet with the old practice of taking a chance they have gone ahead and entered the place with disastrous results to themselves and their fellow workers. In other cases orders to use safety lamps have been entirely disregarded and the gas ignited by naked lights. All of this is a violation of the law and the coal companies are planning to bring that factor to the attention of the proper officials.

Notice that the State Compensation Board will require claimants for compensation to prove that the disability complained of exists is given in an opinion rendered by Commissioner John A. Scott on Oct. 19. A claimant against an Eastern concern contended that the loss of the thumb and index finger of his left hand was equal to the loss of his hand, but the decision says that the Commission is of the opinion that the claimant has not suffered the loss of the use of his hand and will have the use of the other fingers. The claimant is awarded 50 per cent. of his wages for a certain period.

Commissioner Scott says: "It is suggested by the board that the claimant make an honest effort to use the injured hand in such work as may be possible for him to perform; refusing to make this effort, on application by his employer, he will be subject to medical examination to determine whether practical use of the three fingers has been retained."

In an opinion handed down on Oct. 20, by Chairman H. A. Mackey of the Compensation Board, and concurred in by the other commissioners, the Board makes plain its attitude regarding appeals from awards of referees which are based upon the contention that the person killed or injured was engaged in interstate commerce. An award of compensation to Julia M. Conrad against the Philadelphia & Reading Ry. by Referee W. B. Scott, is confirmed and an appeal dismissed. The opinion, written by the chairman of the Board, is in part as follows: "Where the defendant is a railroad company and seeks to avoid responsibility under the compensation law by entering a defense that the claimant at the time of his injury was engaged in interstate commerce and that state legislation has no jurisdiction, these suggestions become matters of defense and must be substantiated by positive testimony. The defendant under such circumstances must meet the same burden of proof as is demanded of a claimant in the presentation of his claim. In this case it is admitted that the injury was sustained by the deceased while engaged in the course of his employment for the defendant within the State of Pennsylvania. It is also perfectly evident that there would be no question about the claimant's right to compensation were it not for the suggestion that both he and the defendant at the time of the injury were engaged in interstate commerce. The defendant having made this suggestion as a defense and not having established the same, it must fall."

Fatalities in Pennsylvania during September numbered 245, while 21,949 other employees received injuries that disabled them for periods greater than two days.

An average of these figures shows that, during September, 888 workers were injured daily. During the first nine months of this year, 188,278 employees in Pennsylvania were injured while at work, and of that number 1,827 died as a result of their injuries. Two hundred and three workers have been killed each month this year, on an average, and 20,717 others injured.

PENNSYLVANIA
Anthracite

Pottsville—As Oct. 29, Mitchell Day, falls on Sunday, the celebration will be observed on the Monday following, when it is expected that every operation in the anthracite region will be closed down.

Eckley—What indicates an improvement in the labor supply of the Lehigh region occurred on Oct. 19, when the Lehigh Valley Coal Co. started work on the big tunnel, which was abandoned some time ago when the labor supply became low in this region. The tunnel will be the main route for the haulage to the new breaker at that point, and every effort will be made to complete the work before the winter sets in.

McAdoo—Teamsters charged with picking coal from the old culm banks at the abandoned Silver Brook colliery, and selling it for $1 and $2 a load, have been arrested on complaint of the Lehigh Valley Coal Co. and fined. With the cost of anthracite steadily advancing, teamsters are said to have made profitable hauls from the abandoned workings. The various coal companies have started a crusade to stop the practice of men helping themselves to winter supplies.

Nanticoke—Disregarding the order of colliery officials to stay out of a chamber in No. 4 slope, No. 4 colliery, of the Susquehanna Coal Co., because of the danger from black damp, a miner and his laborer on Oct. 19 lost their lives through a desire to recover some mining tools left in the chamber more than a month ago. Frank Dorski, the miner, had worked in this slope more than 25 years and reported the presence of black damp a month ago. His laborer, John Shinitski, had been married on Oct. 15 and had just returned from a wedding journey.

Mt. Carmel—With all modern improvements, such as electric motors for mine haulage, the mule is still a necessity in certain work. Two carloads of these animals arrived for Philadelphia & Reading Coal and Iron Co. collieries on Oct. 20.

Browntown—Three houses on Tedrick St. were badly damaged by a mine cave recently. The subsidence was caused by robbing pillars in the Pittston vein of the Butler colliery of the Hillside Coal and Iron Co. The buildings were badly damaged and the street level was lowered about 6 ft. for a distance of 150 ft. Work was immediately started by the coal company to repair the damage.

Jeddo—Dropping a can of carbide into a water-filled ditch in the mines at the No. 4 colliery of the G. B. Markle Co., Merrick Dartelando generated gas in such quantities as to cause an explosion that burned him severely about the face and hands. He was carrying the can which contained a large quantity of the material to a section of the mine where it was to be distributed among the miners.

Lansford—The Lehigh Coal and Navigation Co. will endeavor to operate its collieries a full day on Saturdays. During the summer season Saturday was a half holiday and the miners are disposed to make it a half holiday the year around.

In order to mine the area lying north of Panther Creek, which is underlaid with coal measures, the settlement known as "Little Italy," comprising a population of about 900 people, will be moved.

Hazleton—The Lehigh Valley Coal Co. has given title to the city for 10 acres of land, without compensation, to be used as the site of a sewage-disposal plant.

Minersville—The lives of 16 mine workers in the Lytle colliery of the Susquehanna Coal Co. were endangered on Oct. 23, when they were trapped in a gangway by fire which spread among the timbers. All of the men escaped without serious injury, but eight of them were overcome by gas and had to be carried out by the rescue corps. A second explosion occurred at the Lytle shaft, shortly before noon on Oct. 24, in which five men were seriously injured and three slightly burned. The explosion was caused by the fire setting off a pocket of gas formed by brattices built to head off the flames. Five of the men are in the Pottsville hospital.

Pittston—Evidencing the trend of the anthracite industry toward the elimination of waste in production is an arrangement at the new Ewen colliery of the Pennsylvania Coal Co. Under the breaker is an inclined concrete floor, upon which fall the droppings from the chutes and machinery. Every day this floor is cleaned by the simple process of turning a stream of water upon the incline and washing everything on the floor to the lowest point in a chute, whence the coal and refuse are hoisted to the breaker and put through the pickers again.

Bituminous

Brookdale—The Grazier Coal Mining Co. has awarded a number of prizes to its employees, who have made suggestions for safety improvements. John Kauffman, a weighmaster at the No. 2 mine, has been awarded the September prize.

Boswell—The new tipple of the Standard Quemahoning Coal Co. is in service, and the tonnage of that plant has been greatly increased.

Driscoll—Test holes are being made in Cambria Township, where new mines are soon to be opened. The owners of the property in this section plan to develop the field in the near future.

West Brownsville—The tipple, electric plant and five barges loaded with coal, the property of the Diamond Coal and Coke Co., were destroyed by fire Oct. 23, with a loss of $150,000. Thirty-five miners' houses nearby were saved when firemen from neighboring villages chopped to pieces several buildings in the path of the flames. The company suffered a severe loss five weeks ago, when its tipple at the Hustead mine was destroyed by fire.

Johnstown—A large order for bituminous coal for shipment was sold on Oct. 18, at $4 a ton at the mine mouth. This is the highest price so far in this locality for coal at the mine mouth, and shows conclusively that the upward trend of prices is nearing panic levels. Coal is being sold on long-term contracts at $2.50 a ton, which is regarded as a price warranted only by the extraordinary conditions prevailing in the market at this time. Factors which are tending to drive the price still higher are the unsatisfactory labor supply, the approach of cold weather and the shortage of cars. Railroads are said to be anywhere from 10 to 50 per cent. behind requirements in supplying cars in this vicinity.

Pittsburgh—Sales of coke were reported at $6 a ton for spot delivery on Oct. 20. This is the highest price in many years. Men who predicted that coke would command $6 before the end of the year now talk of $8 coke. The market is advancing so rapidly that it is difficult to quote prices. Run-of-mine coal is selling at $4.25 per ton. This represents an advance of $3 over the price prevailing a few months ago. The coal market is greatly excited. One steel company on Oct. 20 paid $4.50 for gas coal and steel makers all over the country are buying steam and gas coal for spot delivery. Coal dealers of Sharon on Oct. 19 advanced the price of all grades of coal $1 a ton. This is the highest price for this fuel in history.

Charleroi—It is strongly rumored that the Cambria Steel Co. is contemplating the purchase of the Marianna mine. It is stated that engineers of the Cambria company are making a survey of the Marianna property, and it is believed that the deal will be consummated.

Connellsville—Irregularity of car supply and a continued shortage of labor combined to reduce the coal and coke production in the Connellsville region recently to 544,000 tons per week reckoned on a coke basis. This compared with 568,000 tons for the previous week. Some consolation was derived, however, from the steady rise in coal prices to $3 to $3.25 or better per ton in sympathy with the advancing price of coke.

Uniontown—A price for coke of $7 per ton was recently realized for the first time in the Connellsville field. A local operator sold 10 carloads at that figure.

WEST VIRGINIA

Grafton—The property of the McGraw Coal Co. including the coal land, operating plants and stock of merchandise at Simpson, was recently sold at auction at the front door of the courthouse. The total indebtedness against the McGraw company amounted to $700,000. The new owners will take charge of the property at once and operate it as heretofore.

Longacre—The Kanawha & Hocking Coal Co., H. L. Warner, general manager, has begun making general improvements. A new substation is being installed.

Nucklow—The Paint Creek Coal Mining Co. is installing a new substation to receive power from the Virginian Power Co.

Berwind—The New River & Pocahontas Co. recently purchased two 6-ton gathering locomotives. Many additional miners have come in, and the output has been correspondingly increased.

Charleston—At the annual meeting of the Kanawha Coal Operators' Association, discussion of the car shortage in the fields represented by the organization was the principal subject of discussion. It was voted that a committee be appointed to call on the officials of the New York Central Lines and ask for a better car supply. It was stated that 160 cars are being supplied, where the normal demand is 600.

ALABAMA

Marvel—Twelve men were entrapped by an explosion in the mine of the Roden Coal Co. at this place Oct. 22. Seven were white and five negroes. The cause of the explosion has not definitely been determined, but it is believed that it was due to gas, although the mines were tested and found safe a few hours before the disaster.

Bayview—A model mining camp is being established at the Bayview coal mines of the Tennessee Coal, Iron and Railroad Co. The town of Bayview is to be a model mining town.

Birmingham—Every railroad in the Birmingham district is short of coal and coke cars. The officials are making but little progress to relieve the situation. Several large mines are shut down on account of the shortage. Presidents of several of the railroads have been in Birmingham within the past few days and the situation has been put up to them. Coke producers claim that they could ship 500 cars of coke if they could get the cars. Mines of the DeBardeleben Coal Corporation and the Alabama Fuel and Iron Co. are shut down for a few days because of the car shortage.

C. H. Nesbitt, chief state mine inspector, reports that as a result of the demand and good prices, several coal mines in this district will open again, after being shut down for the past few years on account of the slow demand. Mr. Nesbitt says: "The coal business is better now than for several years. With a big demand and good prices, the only drawback being the car shortage."

KENTUCKY

Whitesburg—Reports received here from the Cumberland River coal fields are to the effect that the car shortage is seriously affecting operations, especially those of the smaller companies, in that territory. Many of the operating companies are only averaging three to four days a week. The Wisconsin Steel Co., one of the largest in that territory, is running six days per week, however, at Benham. Reports from Hazard, Perry County, state that the 20-odd plants around that city are having little trouble in getting all the cars they can load and are operating, without a single exception, every day in the week. The same is true in the different big plants in the coal fields of this (Letcher) county. Coal operators say that the only trouble in this field is the constant shortage of labor, as men are reported to be hard to hold, and new men are being constantly added. The Elk Horn Mining Corporation imported 300 extra men recently.

Local capitalists are organizing a coal company here to make developments of the coal fields around the city. It is expected that the organization will be complete and the development started within the next 30 days. The company will have a capital of about $100,000.

The Harlan County Coal Operators' Association has been organized at Harlan. The association has offices in the Harlan First National Bank Building. E. R. Clayton, of the Wallen's Creek Coal Co., is president of the new association, and regular meetings will be held.

Hamden (P. O. Jeff, Ky.)—The Kenmont Coal Co. has added 100 extra men, carpenters, to its building operations near Hamden, where it is starting a coal-mining plant. It is expected that the first shipments of coal will be made within three weeks. A spur-line branch of the Louisville & Nashville is being built into the new town under construction.

Owensboro—The Fern Hills Coal Co., which has changed hands several times in the past few years, has been purchased by J. H. Sowden, of Barbourville, Ky., who will begin operations shortly. It is reported that the purchase price was $25,000.

Sturgis—The West Kentucky Coal Co. is completing construction of a modern water-works plant and filter system at a cost of $40,000. The power station and reservoirs are situated on the Tradewater River and the supply will be sufficient for all purposes.

OHIO

Columbus—Ohio mines are said to be restricted to 40 to 60 per cent. of their capacity on account of an inability to get cars. Many mines on this account are operated only three days a week. The situation is described as one with a maximum demand for fuel and a minimum of rolling stock to transport it.

The Ohio Industrial Commission has issued a bulletin ordering firebosses in all Ohio mines to cease the use of open lamps in making inspections of workings. The bulletin calls attention to the dangers of using open lights, although admitting that the inclosed lamps are often inadequate for making proper inspections.

Dennison—Following the death, on Oct. 12, of Chauncey G. Newton, president and general manager of the Newton Coal and Mining Co., meetings of the stockholders and directors of the company were held at Dennison on Oct. 21, when the following officers were elected: Edward H. Coxe, of Pittsburgh, Penn., general superintendent of the United Coal Corporation, president, and Samuel D. Fitton, of Hamilton, Ohio, vice-president. Henry D. Woodbridge, of Newark, Ohio, was reëlected secretary and treasurer. Frank O. Culley, of Dennison, former superintendent of the company, was elected general manager and will have active charge of the operation.

INDIANA

Linton—Surveyors recently staked out the site for the new Gould mine on the Baxter Saucerman farm. Work of sinking the shaft will be started soon.

ILLINOIS

Springfield—The Illinois Coal Operators' Association met here recently with 50 delegates present, and elected the following officers: President, James Needham, Chicago; vice-president, D. W. Buchanan, Chicago; secretary-treasurer, F. C. Honnoid, Chicago. C. M. Moderwell, the retiring president, was given a vote of thanks. President Needham said labor conditions were much more satisfactory now than a year ago and he predicted that as a result of improved industrial conditions the next year's business would be excellent.

Taylorville—The Illinois Public Utilities Commission has ordered the Chicago & Illinois Midland R.R. to put on an early morning train between Taylorville and Kincaid, a distance of 7 mi., so that 100 Taylorville miners can ride to their work at Kincaid. A train which formerly arrived at Kincaid at 8 a.m. was discontinued last June.

Edwardsville—Robert W. Griene, of Collinsville, county mine inspector for Madison County, has completed his report for the past year, which shows that 3,768,730 tons of coal was mined in the 22 mines operated in the county. There were 3,707 men employed and 42,107 kegs of powder were consumed. During the year 14 men were killed and 124 others were injured. The fatalities were distributed as follows: Livingston, 3; Collinsville, 4; Maryville, 2; Williamson, 1, and Prairietown, 1.

Personals

James E. Roderick, chief of the Department of Mines of Pennsylvania, on Oct. 24 announced the appointment of Richard A. Maize, Boswell, Somerset County, Penn., as mine inspector of the fifth bituminous district to succeed Isaac G. Roby, deceased. Mr. Maize's headquarters will be at Uniontown, Fayette County.

William H. Brown, of Jerome, Penn., inside superintendent of the United Coal Corporation's mines at that place, has been appointed mine inspector of the United Coal Corporation and subsidiary companies the Pittsburgh & Baltimore Coal Co. and Naomi Coal Co., having headquarters in Pittsburgh, Penn.

Julius Bierach, sales manager for the St. Bernard Coal Co., at Louisville, has returned to his office after an absence of six weeks. He has been in poor health and has been at Salem, Ind., where he has been undergoing treatment at the hands of his son, Dr. J. L. Bierach. Mr. Bierach suffered from a semibreakdown. He had been on the job early and late for 13 years without a vacation.

Kenneth U. Meguire, president of the Harlan Coal Mining Co. and the Harlan Coal Co., left for Washington recently in connection with the hearing on the freight-rate case. He is the witness for operators of eastern Kentucky and Tennessee in the case before the Interstate Commerce Commission relating to the proposed increase to points in Central Freight Association territory. This will conclude testimony taking in the case at hand.

Frank James and **Mart Ellinger**, former superintendents for the Dravo Contracting Co., of Pittsburgh, Penn., have formed a partnership under the firm name of James & Ellinger, doing all kinds of rock and shaft work and making a specialty of grouting. They have completed the first 50-ft. section of concrete in record time at the Royal air shaft of the W. J. Rainey Co., Royal, Penn., and are also progressing favorably in their work on the Beaverdale air shaft of the Logan Coal Co., Beaverdale, Penn.

Obituary

John F. Sweeney, a mining expert, died at his home in St. Clair, Penn., on Oct. 21, from the effects of miners' asthma, which he contracted from many years' work underground. He was a member of the miners' examining board.

James J. Jones, one of the pioneer coal operators of central Illinois, died at his home in Coulterville, Ill., recently. Mr. Jones was 78 years old and had been a resident of Coulterville for the greater part of his life and a coal operator for half a century. He was identified with the sinking of three mines and at his death was the owner of the West Side Mine at Coulterville, which is now being operated by his son, Louis D. Jones.

Joseph **Lumley**, widely known engineer, and one of the oldest manufacturers of mining machinery in the United States, died at his home, 1312 Erie Ave., Philadelphia, Penn., on Oct. 21, following an illness of three months. Mr. Lumley was born in Dublin, Ireland, and came to this country with his parents when he was five years old. When a young man he began the manufacture of hoisting engines and oil-well machinery, at Columbus, Penn. Forty years ago he removed to Philadelphia, and started the manufacture of boilers and mining machinery. He installed some of the largest mining plants in this country and South America. Mr. Lumley is survived by his widow, one daughter and one son.

Louis M. Jones, of Pittsburgh, Penn., mining engineer and expert rescuer of the Bureau of Mines, lost his life while directing the rescue work at the mine explosion at the mine of the Jamison Coal and Coke Co. at Barrackville, W. Va., a few miles from Fairmont. Mr. Jones was born in Cleveland, Ohio, and took up his residence in Pittsburgh after he entered the employ of the Bureau of Mines in February, 1909. He was a graduate of the Columbia School of Mines, of New York, and was an honor man in his studies. He is survived by a wife and one child. Under the chief mining engineer of the Bureau Mr. Jones had charge of the Experimental mine at Bruceton, Penn., a few miles out from Pittsburgh. In this capacity he developed many safeguards that are not only saving life in the coal mines today, but will be instrumental in the saving of many other lives in the future.

Chauncey Guy Newton, of Ulrichsville, Ohio, died at his home recently of typhoid fever, after an illness of between five and six weeks, at the age of about 47 years. He graduated at the Ohio State University, served on the engineer corps of the Columbus & Hocking Coal and Iron Co. at Buchtel, Ohio, then as assistant engineer and later chief engineer of the Congo Coal Mining Co., at Congo, Ohio, later returning to Congo as general superintendent of the Continental Coal Co. after the Congo mines and others had been merged into that company. He was later general superintendent of the Columbus & Hocking Coal and Iron Co., which position he resigned about 12 years ago to organize the Newton Coal and Mining Co., to lease and operate a coal mine near Dennison, Ohio, of which company he has since been president and general manager, and during part of which time he also served as city engineer of Dennison, Ohio. He was associated also in mining engineering work with Prof. Frank A. Ray, consulting mining engineer, of Columbus, Ohio. Mr. Newton was married 19 years ago to Miss Annie Fitton, of Hamilton, Ohio, and is survived by his widow, one son, Chauncey Guy, Jr., two daughters, Louise and Nan, also one brother, Henry, of Huntington, W. Va.

Industrial News

Springfield, Mass.—The Witherbee Ignitor Co. is now installed in its new plant. The building is 70x203 ft. in dimensions. It is of fireproof construction.

Chicago, Ill.—The Clarage Fan Co., of Kalamazoo, Mich., recently opened a branch office at 123 West Madison St., Chicago. This office is in charge of L. O. Monroe, who has had several years' experience in the fan business.

Whitesburg, Ky.—The Cumberland Telegraph and Telephone Co. has just completed its long distance lines into the Harlan County coal fields. As a result coal operators will be much better served than formerly. All the mining towns have been given connections.

Cincinnati, Ohio—The Rapp Coal Mining Co., which has been the subject of involuntary bankruptcy proceedings, has filed its schedules in the United States District Court, listing liabilities of $25,379.42 and assets valued at $9,277.05. The largest creditors are all coal concerns.

Youngstown, Ohio—The investigation made by the Youngstown Chamber of Commerce into the coal situation, brought about by a belief that its exact causes should be ascertained, if possible, resulted in the conclusion that present coal prices are justifiable, on account of the car shortage.

Fairmont, W. Va.—The Western Maryland Railway Co. is figurnig on an order for 20 Mallet locomotives. These machines will cost about $50,000 each. Delivery is not expected within nine months. The engines will have 32 wheels each, and will be especially designed to haul heavy freight trains over the mountains.

Johnstown, Penn.—Local coal operators give little credence to the reports that a new embargo would be placed on coal on the New Haven and the Baltimore & Ohio railroads. No notices of an embargo have been received here, they say. A shortage of cars is preventing this section from enjoying the biggest boom in coal it has ever had.

Springfield, W. Va.—In direct contrast with conditions in other fields the Widemouth section of the Pocahontas field has been working full time. Cars have been plentiful and miners are easily picked up when needed. It is noticeable, however, that the miners have lately developed a lazy streak and the mines are not doing as well as they should.

Beckley, W. Va.—The September coal loadings handled by the Chesapeake & Ohio R.R. in the New River field, fell 135,000 tons short of the August record. The total shipment for September over the Chesapeake & Ohio was 661,405 tons. Tidewater coal amounted to 313,335 tons; inland east 108,900 tons and west 35,210 tons. Coke loadings amounted to 506 cars.

Cincinnati, Ohio—The rains of the past week are expected to enable the movement of the coal fleet from various points between Pittsburgh and Huntington, with from 100,000 to 150,000 tons of coal for this and other river markets. The receipt of river coal will help considerably in relieving a threatened shortage of fuel locally, but is hardly expected to have any effect on prices.

Huntington, W. Va.—The three towboats, "Charles Brown," "Enterprise" and "Cruiser," owned and operated by the Pittsburgh Coal Co., are tied up at the company's docks on the Ohio side of the river. This is due to the exceptionally low water for the past three weeks hindering operations of these boats. With the coming of a barge stage it is predicted that coal-shipping records will be broken.

Spangler, Penn.—Work was recently started on the new slope of the Peale company near No. 9. This operation opens up a large tract of coal heretofore untouched, the tract comprising something over 2,000 acres. This firm has been busy remodeling the Gussie mine. The Penn Central Power Co. has extended its power lines to the Gussie, and put in a substation. It is reported that a new steel tipple will be built there soon.

Edmonton, Alberta—John F. Stirling, chief inspector of mines for Alberta, is of the opinion that there will be a large demand for coal in Alberta, Saskatchewan and Manitoba, when severe weather sets in and advises the public to lay in supplies as soon as possible. There is a labor shortage at the mines owing to enlistments and he anticipates that this will be considerably worse in the course of another two months.

Philadelphia, Penn.—A special meeting of the stockholders of the Duncan-Spangler Coal Co., operating mines in Cambria County, has been called to take place in this city on Nov. 18 to consider the proposition of releasing to the Blubaker Coal Co. coal mined from the "D" seam in the Michael J. Platt and Alexander Lloyd tracts. These tracts are now under lease by the Blubaker Coal Co. to the Duncan-Spangler Coal Co

Columbus, Ohio—An award of $3,744 and funeral expenses has been allowed by the State Industrial Commission, under the workmen's compensation law, to Mrs. Olive M. Rankin, of Martin's Ferry, incident to her husband, Lee Rankin, meeting accidental death in the line of duty. As paymaster of the Youghiogheny and Ohio Coal Co., Mr. Rankin was murdered a few weeks ago while en route in an automobile taking the payroll to the men at the mines.

Youngstown, Ohio—The several large iron and steel plants in this vicinity are complaining bitterly over their inability to secure as much coal as they desire, as well as at the high prices charged for such fuel as they can get. Coal for coking purposes is scarce, and prices of bessemer iron and steel, as well as of coke, are directly affected. Many steel men are already reported to be drawing on their reserve fuel supply, and this is extremely unusual so early in the season.

Kansas City, Mo.—Car shortage is the perplexing problem with which the miners and operators in Kansas, Arkansas, Oklahoma and Missouri mines, south of the Missouri River, have to deal. In southern Kansas the shipment of steam coal is five days slow. The supply is short from the lack of cars. In the Arkansas field steam-coal shipments are 15 days slow. Here also the supply is short. In the Missouri field steam-coal shipments are five days slow, and the supply is limited by the lack of cars.

Springton, W. Va.—Much important construction work is going on near here. The S. J. Patterson Pocahontas Co. has underway its new improved Link-Belt tipple and is expecting to run coal over it in another month's time. Just opposite this work in the same hollow the Turkey Gap Coal and Coke Co. has started erection of its new and uptodate tipple, which it expects to finish soon. Both the above companies are erecting new houses. It is estimated that fully 150 men are engaged on this new work.

Regina, Sask.—As regards the coal situation F. Hedley Auld, deputy minister of agriculture, states that of the total requirements of the province only one-tenth of domestic and one-fifth of the steam coal needed is now in transit. Representative dealers numbering 125 reported that they had approximately 20,000 tons of domestic coal while their winter requirements were estimated at 220,000 tons. The difficulty is due to labor shortage in the mines and it is hoped that conditions may be improved when harvesting is over.

Binghamton, N. Y.—Twenty-two directors of the Anthracite Trust Co., of Scranton, recently tendered a surprise to C. E. Toby, fellow board member, former coal expert, and general manager of the Delaware, Lackawanna & Western R.R. coal department, who recently moved to Binghamton to enter the retail coal business. The surprise banquet was held at the Arlington Hotel. Expressions of regret at Mr. Tobey's departure from Scranton, and expressions of hope for continued success in Binghamton were freely expressed.

St. Louis, Mo.—A survey of the car shortage on the railroads in the southern Illinois coal field entering St. Louis has developed that the supply of cars is just about 30 per cent. The following figures show what mines on the different roads are able to do in the way of securing equipment for working days every week: Wabash, 3½ days; Vandalia, 3 days; L. & N., 3 days; Southern, 2¼ days; M. & O., 2 days; I. C., 2¼ days; I. M., 2½ days; B. & O., 3 days. This does not include cars furnished for railroad fuel. The above is made on the basis of commercial shipments.

Buffalo, N. Y.—Argument will be had shortly before Justice Brown at Batavia, N. Y., of the case of the receivership of the Pittsburgh, Shawmut & Northern Railroad Co., on an adjournment from Buffalo. The receiver, Frank Sullivan Smith, who is also president of the road, wishes to continue the receivership, but the owners of the certificates of indebtedness, Kidder, Peabody & Co., for the Central Trust Co., wish the road to be sold. Judge Alton B. Parker will represent the receiver and Alexander & Green the opposing interests.

Columbus, Ohio—Columbus faces an anthracite coal famine, according to the statement of operators and dealers. The price was advanced by some dealers on chestnut anthracite to $10 a ton, and even at that price they say it is impossible to get the coal. Reports from New York show that there is a great scarcity of coal there and that the dealers are alarmed. A search of the Eastern territory shows that practically all of the hard coal, which in other years has been piled up awaiting orders, has disappeared. Columbus dealers say that even the price of $10, which is $2 more than was charged a year ago, will likely have to be raised.

Chicago, Ill.—While the Western Electric Co. has filled no war orders, it has felt the effect of the war by limitation of raw material and supplies on the one hand, and an abnormal demand for its products on the other. A conservative estimate of the gross business done by the company to Dec. 31 of this year will reach $100,000,000. This refers to actual shipment of goods to customers and not to incoming orders booked, which will be much greater than this amount. The previous biggest year's gross was $77,000,000. As a result of this enormous business the directors have authorized further plant additions which will call for the expenditure of nearly $1,000,000. The company now employs 23,000 people.

Washington, D. C.—U. S. Consul Ingram, located at Bradford, England, has reported to the State Department that chemical engineers are engaging in an agitation there for Government control of the coal supply so as to conserve the byproducts, which are now of importance in producing internal combustion engine fuel and dyestuff bases. It is being urged by prominent chemists that instead of using raw coal as fuel that the Government shall by law require coal to be coked and thus save the byproducts. In this way large quantities of liquid fuel would be obtained, also large quantities of ammonia. It is further suggested that the conservation of fuel could be effected by allowing the export of coke only and prohibiting absolutely the exportation of bituminous coal. It is pointed out here if such a practice is adopted it would open still greater markets for American bituminous coal, because of the fact that the countries which have been in the habit of securing an enormous tonnage of fuel from Great Britain would not be able or willing to depend entirely on coke in place of bituminous coal heretofore used.

St. Louis, Mo.—The Fifth and Ninth Districts Coal Bureau has been organized with a membership of 43 companies in the fifth and ninth districts of Illinois. Offices have been opened at rooms 600 and 601 Fullerton Building, Seventh and Pine St., in charge of P. H. Greenlaw as secretary. The declared purposes are—to conserve the deposits of coal in the two districts, by increasing the yield per acre to the maximum; to coöperate with organized labor to the end that labor may receive a fair wage, reasonable hours and sanitary working conditions, including the promotion of movements for the safety and welfare of the men; to standardize as far as possible the method of arriving at the cost of production and accounting systems in use by the members and to furnish to each member the benefit of discoveries or plans leading to a lowering of cost of mining and marketing; to better trade conditions by having members informed of sales, tonnage and prices; to preserve harmonious relations between producers, insure coöperation by disseminating to members information of past transactions, conditions under which coal is mined and sold, and cost of production, for the benefit of the industry, the trade and the public. It is declared that all information reported to the bureau will pertain to closed transactions and that the bureau will not fix prices, divide territory, limit production or marketing or limit competition. The bureau will also strive to secure and maintain just rates and regulations from the common carriers. The executive board will consist of seven members. Rotation will be secured by electing one member every month after the first seven have been elected. There will be committees on conservation and safety and on accounting and cost of production. Monthly meetings are to be held.

Market Department

GENERAL REVIEW

Rumors of increase in anthracite circulars and situation resembles a strike market. Illinois coal shipped into the Eastern district. Active bidding among steel interests for Pittsburgh coal forces prices up to prohibitive levels for other consumers. Unprecedented high prices in Middle West fails to restrict buying.

Anthracite—The big development of the week in hard coal circles is the persistent rumor that the companies are seriously considering an increase in the winter's circular. While such action would establish a new precedent in the anthracite trade, it is clear that a more propitious time for putting an increase into effect could not be selected; with the prices of all kinds of commodities being whirled up to unheard of figures, the hard-coalers are in a peculiarly advantageous position to effect an increase that would in ordinary times evoke a storm of bitter criticism. In the meantime the situation grows more tense each week, and is now marked by all the characteristics of a strike market. Some companies are sold up full, and are pulling in their salesmen and notifying jobbers and middle houses that no more business can be considered under 60 days at the minimum. In the more distant markets buyers whose anxiety has heretofore been quieted by the statements of heavy shipments as compared with a year ago, are now realizing that the shortage is a reality, and are bidding up prices strongly in their efforts to acquire tonnage.

Bituminous—With the comparatively lean Illinois coal being shipped through Ohio and Pennsylvania, two of the richest coal producing states in the country, and on into New York, some idea of the tense situation prevailing in bituminous circles can be understood. Though the tonnage involved obviously cannot attain to important proportions, the fact that such a shipment has been made is in itself significant. Almost unheard of figures are already being offered for any free tonnage that appears, while another feature of the situation is that the differentials between the various grades and sizes are being practically wiped out. Abrogations of contract on some technicality is developing considerable inquiry for new contracts, and while operating interests are not disposed to show much interest, there is none the less some very attractive offers of long-term contracts at exceptionally profitable figures. Disaffection in labor circles is another ominous factor looming up, while car supply is desperately short, and ruling prices clearly indicate the great anxiety of shippers.

Lake Trade—The Pittsburgh district market is completely out of hand, as a result of heavy bidding between steel interests which has forced prices up to spectacular levels where ordinary manufacturers working on average margins of profit are entirely unable to compete. A reaction from these abnormal figures seems inevitable if consumption is to continue, though the reduction will be of moderate proportions. The car situation has become still more acute, the usual accumulation which the railroads have always been able to get ahead over the week end having failed to materialize at the opening of the current week. The severe shortage is developing various new aspects to the trade, as for instance, in certain cases where outputs are being held up by labor disturbances, it has been suggested that if the contract purchaser would meet the extra cost demanded by the miners, operations might be continued, and they could be assured their quotas. Even the impending national election is having no influence whatever on the situation as is usually the case, and this in spite of the fact that the political line-up as interpreted by the big interests is looking steadily less favorable.

Middle West—Evidence of the real and urgent character of the heavy demand was seen this week when an attempt of the operators to restrict buying by quoting prohibitive figures seemed only to have the reverse effect; buyers became more insistent than ever at the new high levels, apparently anticipating still further advances. A sudden cold snap precipitated a flood of domestic business also, which tended to accentuate the shortage, and the market is practically out of control. At times it has even been absolutely impossible to get spot coal at any figure. The car situation continues to dominate the market, and the shortage has become more acute, due to a considerable movement to the South. Some record high prices have already been paid for coal in this section, and all the mines are sold up for at least two weeks ahead, and a great many up to Dec. 1.

A Year Ago—Anthracite orders slowing down, but market still firm. Strong upward tendency in bituminous continues. Exports show a moderate increase. Lake trade expanding with approaching close of navigation.

Boston News Bureau—All statistics coming to hand confirm reports as to the vast scope of general trade and profits. There is no halt in this activity and is not likely to be as long as we are able and willing to assist in financing the allies. Moreover, people are more inclined to believe that the foreign demand for American products will continue after the war for the simple reason that we shall be in better position to produce than war-wrecked Europe. One of the surprising features is the fact that money continues to accumulate here in face of the enormous demands of the world. But the explanation is given in the imports of $423,000,000 gold since Jan. 1, and its resultant loan expansion ability.

Iron Age—It is a case of getting the mills to book the steel, and 4¼ to 4½c. a pound will be paid on several hundred thousand tons now being negotiated, against 3½c. on the last contracts. It is said unreservedly that France and Italy will take all the war steel our manufacturers can furnish for the second half of next year. One steel company is asked to quote on 100,000 to 300,000 tons. France's needs are very large. In the case of ⅜- to ⅝-in. rounds, for which soft steel was wanted, the buyers now offer to take rollings from shell-steel discards. France also asks for 30,000 tons of annealed, galvanized, and varnished wire for fourth and first quarters. Barb wire could not be had, and it is not certain that the modified inquiry can be considered. With prices of semi-finished steel $15 to $20 higher than one year ago, and of finished materials $20 to $30 higher, there is more expectation of further advances than existed in October, 1915.

American Wool and Cotton Reporter—A more active week has not been seen in the wool market since February, 1915. Sales for the week totaled 11,000,000 lb. The market is exceedingly bullish. Dealers would rather buy than sell and the end of the supply is in sight. Sales of the week consisted mostly of territory and scoured wools. Generally speaking, greased wools have advanced a cent a pound, scoured wools 3c., and carbonized wool 3c. In the woolen and worsted goods market the interest in the coming heavy-weight season increases. More inquiries have been made up to the present time than in a normal season.

Bradstreet—Trade and industry never moved at a quicker pace than at present. Old record measures are constantly giving way to new ones, and while abnormally high commodity prices counsel caution lest a sudden veering of trade winds may come, demand is so insatiable that buying seemingly will go on while the European war lasts. As yet there is no sign of the saturation point being reached as regards supplies of goods, and while high prices are complained of, there is no evidence, aside from conservatism in buying some textiles that have advanced largely, of the buying movement being checked. This week there was a veritable ground swell of new orders, accompanied by extraordinary quotations for leading commodities and clear evidences that the nation's producing factors cannot meet the demand.

Dun—Maintenance of consumptive demands in unparalleled volume with costs rising rapidly continues one of the most remarkable features of the times. Each week prices, already at an extreme position, go still higher and the advances embrace a wide range of commodities; yet current and forward purchasing is unabated and competitive bidding again accentuates the strength of many markets. It remains the exception where the seller seeks the buyer, and some manufacturers have withdrawn quotations entirely as a means of checking the influx of orders which cannot be filled for months to come, or which they are not inclined to accept lest prices change to their disadvantage. Commercial failures this week are 297 against 277 last week, 261 the preceding week and 400 the corresponding week last year.

Dry Goods Economist—The continued advance in raw cotton and consequent telegraphic withdrawal of offers of goods made by mail have been important features of the week. High as the price of the staple had soared, it has reached still greater altitudes, the price for spot cotton of the Middling Uplands grade in New York exceeding 18½c., thus giving decided color to the recent predictions that cotton would go to 20c.

Marshall Field & Co.—Wholesale distribution of dry goods for the current week shows large gains over the corresponding period of 1915. Road sales for future delivery continue to maintain the large volume of the past few weeks and exceed those of a year ago by a considerable margin. Merchants have been in to market in much larger numbers, and report an excellent retail business. Collections continue in increasing volume. The cotton market is very firm and advancing.

Atlantic Seaboard

BOSTON

Pocahontas and New River spot business practically confined to agencies who are buying to clear vessels. Slow contract shipments cause uneasiness. Georges Creek shippers sag off again on shipments to this market. Embargoes against Pennsylvania grades in large share of all-rail territory. Anthracite shortage serious.

Bituminous—New England is right on the edge of what may easily develop into a panic. All sorts of high prices are rumored on cars at various points and $5 is the quotable figure f.o.b. Hampton Roads for the smokeless coals. While prices may be described as buoyant, there is not now what could be called a broad market. Inquiries are only scattering. It is only natural that consumers having coal due them on low-priced contracts are most reluctant to pay the very wide margin that now prevails on spot coals and many of them are likely to play the limit on their present stocks. At the same time there is a real shortage of marine transportation and with slow loading it is hard to see how the situation can improve any in the next two months. There has been a distinct turn in the Hampton Roads coals since a week ago.

Slow dispatch at Norfolk and Newport News among most of the shippers has the effect of materially shortening up the supply for this market. Inland from Boston, Providence and Portland large numbers of steam plants are adjusted to weekly deliveries from Tidewater and where during the season contractors have been just about able to keep somewhat ahead of consumption a tie-up now would shortly become most serious. Present spot prices at Hampton Roads indicate clearly the great anxiety of shippers to cover on the coal necessary to clear their steamers. Most of these emergency purchases are made of small agencies that have relatively few contract obligations. There are almost no sales of entire cargoes to any of the New England consumers.

The small spurt on Georges Creek deliveries to this market has again faded away. Receipts at the Baltimore piers are now almost negligible and transportation that waited to load has now been cleared with other grades. Car shortage and labor scarcity are still the retarding factors. A few of the barges belonging to the larger shippers have been set in at Hampton Roads to load but the dispatch there is almost as slow as at Baltimore on Georges Creek. Except for trifling amounts none of this grade is available at New York or Philadelphia.

Embargoes against the D. & H and the New York Central are preventing shipments to the large part of New England served by the Boston & Maine and connecting lines. There are rumors of similar action affecting the New Haven lines but so far no announcement has been made. Apparently these drastic measures are not affecting the price of coal f.o.b. mines, for new high levels are reported each day. The demand is very strong not only all-rail but at Tidewater loading ports as well; $3.75@4 have been quoted and at this writing $4.25 is mentioned as the current price for good grades from Cambria and Somerset counties.

Most shippers are much in arrears on contracts. Car supply is desperately short and the trade is wondering how it will end. The situation is plainly up to the railroads which lack the capacity to carry the coal that could otherwise be produced. True, the demand is abnormal, but there is little foundation now for the opinion on the part of some that the demand will recede before many weeks. It is not so much a case of New England buyers losing their heads as a genuine shortage of railroad equipment to supply urgent needs.

Bituminous at wholesale is quoted about as follows, f.o.b. loading ports at points designated, per gross ton:

	Clearfields	Camb. & Som's't	Georges Creek*
Philad'la...	$4.25@4.75	$4.50@5.00	$3.07@3.17
New York..	4.55@5.00	4.80@5.25	3.37@3.47
Baltimore..	.....	.....	3.00@3.10
F.o.b. mines	3.00@3.75	3.35@4.00	2.00@2.10

* On contract.

Pocahontas and New River are quoted at $4.75@5 f.o.b. Norfolk and Newport News, Va., and $6.75@7 on cars Boston and Providence for inland delivery.

Anthracite—It is now realized that this market is generally short of domestic sizes. Hitherto

anxiety has been relieved by the relatively large receipts coastwise for the nine months from Jan. 1 as compared with 1915, but September tonnages and the figures thus far for October have shown such a marked falling off that the trade is now alive to the true situation. Shipments from all the regular companies are most discouraging. The public is not as yet starting any "run on the bank," chiefly because the larger consumers are fairly well supplied for the moment. Week to week trade, however, is being held down to minimum amounts by all the dealers.

Effective Oct. 23 the Boston retailers advanced the price of egg 75c., stove 50c. and chestnut 25c. The following table shows present retail prices in various parts of New England, net tons:

	Egg	Stove	Chestnut
Boston	$8.75	$8.75	$8.50
Springfield, Mass.	8.75	9.00	9.00
Providence, R. I.	9.50	9.75	9.75
Haverhill, Mass.	11.00	11.00	11.00
Bangor, Me.	9.25	9.25	9.25
Portland, Me.	8.75	9.00	9.00
Worcester, Mass.	8.85	9.10	9.10

Chestnut and pea are now practically the only sizes that can be had at Philadelphia or New York for reasonably prompt loading. "Independent" coal is selling at $7.75 f.o.b. New York for assorted sizes and at $5.75@6 f.o.b. mines.

NEW YORK

Anthracite short and individuals getting big prices; $2 premiums for domestic coals the rule. New England and the West calling for heavy tonnages. Five dollars offered for bituminous coal at Tidewater with mine quotations higher. No let up in demand. Good grades practically out of the market.

Anthracite—Supplies are shortening and the buyer is now seeking the seller. Indications are that conditions will become still more stringent and the only visible sign of relief lies in the closing of Lake navigation, which is still five or six weeks off. Individuals are receiving $2 premiums and above for the prepared coals at Tidewater, while mine quotations show still higher figures. The situation is tightening and the wholesale offices are the gathering places of buyers from all sections of the East. The demand from the West and New England continues heavy. Embargoes have added to the troubles of the shippers and many dealers are receiving only sufficient supplies for actual needs.

Comparatively little free coal is being received. The companies are taking care of their regular trade by partially filling orders, while the individuals are taking care of their steady customers. Those dealers who jump from one seller to another in times of plenty are hustling for supplies and are paying stiff prices. Retail dealers have withdrawn their old schedule of prices and are now selling coal according to market conditions.

Inland dealers are paying more for their coal than those at Tidewater and they complain of slow shipments. For line shipments egg, stove and nut are being quoted at $6.50 at the mine, with pea at $3.75. The steam sizes bring $2.10 to $2.40 for buckwheat No. 1; $1.60 for No. 2 and from $1.10 to $1.20 for No. 3.

At Tidewater broken coal continues to move slowly. Contracts are scarcely being kept up. Stove coal is practically out of the market and individuals are getting from $7.75 to $8. Egg is a trifle easier but scarce with Tidewater sales made at 25c. less than for stove. Chestnut is tighter and is being quoted the same as stove.

Pea coal is strong with the best grades out of the quotable list. Some individuals are getting advances of 50c. a ton over company circular. The buckwheat coals are in better demand along the line than at Tidewater; so far there has been no rush for these coals here.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports, are as follows:

	Circular	Individual
Broken	$4.95	....
Egg	5.45	$5.45@7.75
Stove	5.70	5.70@8.00
Nut	5.75	5.75@8.00
Pea	4.00	4.00@4.50
Buck	2.75	2.75@3.00
Rice	2.20	2.20@2.30
Barley	1.95	1.95@2.00
Boiler	2.20	....

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—The bituminous situation grows worse day by day and prices show a steady increase. The labor troubles in western Pennsylvania have indirectly affected this market by the withdrawal of certain tonnages to go West or to Philadelphia. Supplies are scarce and most of the choice coals are not to be had at any price. There has been no slowing down in the buying at the mines and this is in the main responsible for the difference in the Tidewater and mine quotations. Soft coal at $5 was a certainty at Tidewater this week, and actual sales were reported.

The market for a couple of days last week was a trifle easier, but prices remained firm. Reports that labor agitators were busy in the Clearfield district added to the troubles of the operators. Cars continue scarce, although a slight improvement was reported on the Pennsylvania and certain branches of the B. & O. Most operators are not getting more than 50 or 60 per cent. of their normal supply.

The call from New England continues strong and already the heavy hand of the railroad embargo has been laid on certain sections. Water shipments to Sound points remain heavy, although the carrying charges are high. No quotations are below $4.75 at Tidewater, while most of the sales have been at a higher figure. Mine quotations range from $3.25 to $3.75. Quotations for slack were at $3.25, while spot coke was quoted at $6.

Exporters have received inquiries from Nova Scotia as the result of labor troubles. Oversea inquiries continue to come but there is difficulty in getting bottoms.

Current quotations, per gross ton, f.o.b. Tidewater, for various grades, are as follows:

	South Amboy	Port Reading	Mine Price
Georg's Crk. Big Vein	$5.00@5.25	$5.00@5.25	$3.75@4.00
Tyson	4.75@5.00	4.75@5.00	3.50@3.75
Clearfield	4.50@5.00	4.50@5.00	3.25@3.75
South Frk.	4.85@5.00	4.85@5.00	3.60@3.75
Nanty Glo	4.75@5.00	4.75@5.00	3.50@3.75
Som'r. Co.	4.75@5.00	4.75@5.00	3.50@3.75
Que'ho'ing	4.75@5.00	4.75@5.00	3.50@3.75
W. V. Fa'rm't Th'r'qua.	4.95@5.00	4.95@5.00	3.20@3.45
Mine-run	4.75@5.00	4.75@5.00	3.20@3.45
West. Md.	4.75@5.00	4.75@5.00	3.50@3.75

BALTIMORE

Bituminous market shows increased strength day by day. Many big consumers running short. Anthracite too is generally at a premium.

Bituminous—Day by day the soft-coal market keeps stiffening. It is not so much a question of prices just now, although from time to time there are reports of sales at considerably above the recognized level; but it is a problem to get coal at all in the quantity desired. Cars are scarce running as low as 20 to 40% on the Baltimore and Ohio, and around 60% on the Western Maryland. Nearly all the mines are far back on contract deliveries. Coal at tide is selling about 50c. above mine prices and is in urgent demand even at that advance. Many big plants in this section are running close on their supplies and are making frantic efforts to induce shipment on contracts or to fill in gaps by purchasing in the open market.

By the middle of the week the market was greatly excited, practically no coal coming through and prices for all kinds jumped to a mine basis of $5 or over. Not more than a 10% car supply was furnished to the mines on Wednesday and many industries were short of fuel.

Prices to the trade at the mines are now about as follows: Georges Creek, Tyson, $3.75; Somerset, $3.50; South Fork, $3.25; Clearfield, $3.40; Quemahoning, $3.50; Latrobe, $3.25; Freeport, $3.25; Fairmont gas, ¾, $3; mine-run, $3; slack, $2.75.

Anthracite—There is a very active demand for all kinds of coal. Shipments are not keeping pace with the demand, especially on pea and nut coal. Premiums are being generally paid for prompt delivery.

Exports—A great drop has come in the foreign movement from this port, due to the uncertainty of supplies. Only one clearance was recorded on export at the Custom House, the poorest showing in years. This was 138 tons of cargo coal for Spain.

PHILADELPHIA

Anthracite shortage continues. Big shipments of pea despite alleged car shortage. Companies call in salesmen and refuse new business. Cut-price dealers quieting down. Rumor of increased prices on steam sizes. Bituminous quotations continue upward and $5 coal expected this winter.

Anthracite—Even smaller tonnage than last week is being received here at this time, and many of the dealers are now speculating as to whether there will be any relief before severe winter weather shuts off shipments to other markets. There can be no question that the car supply is short, but there is a fairly big tonnage of pea coal coming to Philadelphia, and if cars can be secured to move it the question naturally arises as to why more liberal shipments cannot be made of the larger sizes.

The individuals are receiving big premiums in other markets, in some cases an increase of $1.25 per ton on egg, stove and chestnut, but much less on pea coal, and we know of one instance where a price of $7 at the mines was paid on a small block of stove coal for New England delivery. This would make the retail price of coal after freight and other charges are added, well beyond $10 and shows the remarkable efforts that are being put forth to insure a supply of fuel.

There is no buying of premium coal here for local delivery. The margin of profit between the cost and selling price has always been smaller in Philadelphia than in any of the other large cities, and dealers threaten to close their yards rather than submit to what they regard as extortion. We do know of one comparatively new local dealer who was recently quoted $1 per ton above circular on prepared sizes for a coal that has often been sold to preferred buyers until Oct. 1 at May circular.

One of the big companies has refused to accept any more orders for any size. All of its salesmen and middle houses have been notified that they have already taken more orders than can be filled for at least two months. Another has refused to accept any new business on stove, but is still selling chestnut and pea, hoping the car situation will improve sufficiently to allow it to draw on its immense storage piles of these two sizes.

The entire anthracite situation can only be compared to strike times, and even now it would not be surprising to find the labor question further disturbing the market. It is known there is a grave feeling of unrest in the Schuylkill region and that danger of severe button strikes is imminent. The management of one of the big companies realizes the danger and is devoting careful but quiet attention to it.

The clamor for all sizes continues. Stove coal is now regarded as a luxury and the dealer who succeeds in getting a few cars is envied by his competitors. Some of the largest and most of the smallest dealers are out of this size and it has become quite a habit for one dealer to borrow a few tons from a neighbor who happens to receive a car. There is, of course, no cessation in the demand for egg and chestnut and this latter size continues to a greater extent than ever to be used in place of stove, even at the higher price. The operators report a demand for pea coal appearing in the Western market.

All the steam coals continue extremely active and a rumor has now become current that there will be a general increase in prices on this class of coal in the near future.

It is gratifying to report that the cut-price element among the retailers is very quiet now and in fact one of the most prominent among them has actually increased his prices 25c. a ton.

The prices per gross ton, f.o.b. cars at mines, for line shipment and f.o.b. Port Richmond for tide shipment, are as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.75	Buck	$1.65	$2.55
Egg	4.15	5.25	Rice	1.00	1.90
Stove	4.10	5.60	Boiler	.90	1.80
Nut	4.50	5.55	Barley	.75	1.65
Pea	2.80	3.70			

Bituminous—The intense activity in the market is maintained without the least sign of abatement, and there are a number of fairly conservative authorities who insist that $5 coal will be reached before the winter is over. While the increases of the last few days were not so heavy as in the preceding period, ranging from 5c. to 25c., the tendency has been to draw the prices for all grades closer together until at this time the difference between the slack coals and the highest grades amounts to but 35c. or 40c., and the time seems to be drawing closer when gradings will be disregarded entirely.

While we quote prices less than $3.50, we feel positive that 80 per cent. of the sales recently have been made at that figure. The railroad situation, both as to movement and car supply, grows more serious daily. Many shippers report that their labor supply is sufficient to produce from 65 per cent. to 80 per cent. of their maximum, but with the car supply only 30 per cent. to 50 per cent. of requirements, they have not been able to make the fullest use of the labor at hand.

Owing to the many contracts being cancelled on what would in ordinary times be considered as but mere technicalities, there is an increasing number of inquiries for business of this nature. While the attitude of the shippers at first has been somewhat scornful, there seems now to be a slight turn in the sentiment, as we know in several instances that the requests are being given serious consideration, the idea seeming to be if a contract can be closed at a price near $3, especially for a term of years, as has been intimated in a few cases, it might be worth while. As yet we have not heard of any of this business being closed.

Trading at the piers still seems to offer the most favorable prices to the buyer, especially since a series of severe storms has delayed vessels from reaching port and made it necessary to move some of the coal awaiting bottoms.

It is still difficult to formulate an accurate list of prices, but we offer the following as fairly representing an average per gross ton f.o.b. cars at mines:

Georges Creek Big Vein	$3.45@3.65
South Fork Miller Vein	3.50@3.65
Clearfield (ordinary)	3.35@3.45
Somerset (ordinary)	3.35@3.45
West Va. Freeport	3.15@3.25
Fairmont gas	3.35@3.50
Fairmont gas, mine-run	3.25@3.35
Fairmont gas, slack	3.00@3.15
Fairmont lump, ordinary	3.20@3 30
Fairmont mine-run	3.10@3.20
Fairmont slack	3.00@3.15

HAMPTON ROADS

Shipments comparatively light and stocks down to practically nothing. Prices firm and further advances expected.

On account of the light receipts, coal at Hampton Roads is still below normal. Delays in loading are now the rule, rather than the exception, and there does not seem to be any immediate improvement in sight. One steamer has been in port for the past several days trying to secure some 2,000 tons of cargo for owners' account but up to the present time has been unable to get anything. The Norwegian motor ship "Bayard" recently loaded a cargo for Tiburon, Calif. Motor ships are as yet rather scarce but this class of tonnage seems to be gaining favor with owners.

After unfavorable winds for a week or more the large fleet of sailing vessels in the Roads were at last able to get to sea at the end of last week. It will be noted that a number of part cargoes are moving to Italian ports, the balance of the cargo usually being made up of steel for the Italian Government. The former American-Hawaiian steamer "Aborean," now the Norwegian steamer "Vaarli", is loading a cargo of coal and coke for the River Plate.

From time to time there is some free coal available which always brings excellent prices. There is a feeling in the trade that the high mark has not yet been reached and one large shipper has expressed the opinion that $6 coal will soon be here. Some suppliers on bunker coal have been forced to limit the tonnage to sufficient to allow the steamer to reach the next coaling station, instead of supplying enough coal for the round voyage, as is frequently demanded.

Prices remain at about the same level as last week as follows: Pocahontas and New River for cargo, $4.50@5 f.o.b. per gross ton; on track for local delivery $4.75@5 per net ton; for bunkers, $4.75@5 per gross ton, plus 10c. per ton trimming. Anthracite dealers report they are still delivering on old orders and are unable to accept any new business at present.

Railroad Tonnages—The following is a comparative statement of the tonnages handled by the different roads for the weeks ended Oct. 14, 1915-16, and for the first 16 weeks of the last half of the years:

	Week		16 Weeks	
	1915	1916	1915	1916
Nor. & West...	163,920	111,396	2,958,734	2,617,653
Ches. & Ohio..	81,517	72,092	1,554,135	1,557,530
Virginian.....	51,304	.....	1,120,565	.....
Total.....	296,741	.....	5,633,434	.....

PANAMA CANAL

Fuel movement through the canal for the week ended Sept. 30 was as follows:

Vessel	From	To	Tons
Ilford	Newport News	Iquique	6,000
Caspian	Norfolk	Valparaiso	[1]4,391
Bartolo	Norfolk	Mejillones	4,251

[1] Coal and coke.

Ocean Shipping

OCEAN CHARTERS

Coal charters have been reported as follows during the past week:

PHILADELPHIA

Vessel	Destination	Tons	Rate
Nordland	Havana	1,042	
Dictator	Manzanillo	623	
Leonatus	Antilla		
Wm. C. May	Martinque	607	$7.00

BALTIMORE

Greenland[1]	Cadiz	137	
Lime Branch	Callao	3,468[2]	13.50
Claveresk	Felton	2,441	

VIRGINIA

Mathilda	Rio Janeiro	2,623	
Jersey City	Montevideo[3]	2,955	12.00
Southern	Bahia Blanca	4,228	10.80
New Orleans	Kingston		
Grove	Carribean	665	
Strikestad	Alexandria	3,458	

ATLANTIC RANGE

Oquendo	Callao	1,872	8.00

NEW YORK

Hugh de Payens	Macorus	343	

[1] ex-Relief. [2] Coke. [3] Or Buenos Aires.

OCEAN FREIGHTS

The export coal freight market is extremely dull, principally owing to the high price and scarcity of coal.

Steamers are offering freely for Brazil, River Plate and West Coast of South America, and these rates can be shaded very materially. Trans-Atlantic rates are slightly easier, but owing to the scarcity of available tonnage for West Indian freights these rates are firmer.

We would quote freight rates by steamers as follows:

	Oct. 16	Oct. 23
West Coast Italy....	$26.40@27.60	$26.40@27.60
Marseilles.....	24.00@25.20	24.00@25.20
Barcelona*[2].....	21.60 about	21.60 about
Montevideo.....	13.20 about	12.00 about
Buenos Aires.....	13.20 about	12.00 about
Rosario.....	14.40 about	13.20 about
Rio Janeiro.....	11.50 about	11.00@11.50
Santos.....	12.00 about	11.50@12.00
Chile (good part)....	9.00 about	8.00 about
Havana.....	3.50@4.00	3.50@4.00
Cardenas, Sagua....	5.00 about	5.00 about
Cienfuegos.....	4.50@5.00	4.50@5.00
Port au Spain.....	6.00@6.50	6.00@6.50
St. Lucia.....	6.00@6.50	6.00@6.50
St. Thomas.....	5.50 about	5.50 about
Barbados.....	6.00@6.50	6.00@6.50
Kingston.....	4.50@5.00	4.50@5.00
Curacao[1].....	5.50@6.00	5.50@6.00
Santiago.....	4.50@5.00	4.50@5.00
Guantanamo.....	4.50@5.00	4.50@5.00
Bermuda.....	4.50@4.75	4.50@4.75
Vera Cruz.....	5.50 about	5.50 about
Tampico.....	5.50 about	5.50 about

* Spanish dues for account of cargo. [1] And p.c.
[2] Or other good Spanish port.

W. W. Battie & Co.'s Coal Trade Freight Report.

Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

COASTWISE FREIGHTS

Sentimentally, rates are strong from Hampton Roads to Boston. Practically all the bottoms that were waiting for charters finally got cargoes and the brokers are quoting $2 more hopefully than for some weeks; $1.75 is similarly the rate to Providence, but there is still a dearth of shipping orders in the open market. Loading dispatch is so slow that outside transportation is not likely to be ordered to Norfolk or Newport News except on firm charters and on an understanding about lay days.

Barges for Fall River and New Bedford out of New York are still very firm at $1.35, with 10c. less to Providence; $2.75 is asked to Maine points.

VESSEL CLEARANCES

The following vessels have cleared with coal cargoes during the past week:

NORFOLK

Vessel	Destination	Tons
Tampico[1]	Para, Brazil	2,705
Giovanni G.[1]	Genoa, Italy	806
Corfu[1]	Genoa, Italy	1,595
Nantwen[8]	Genoa, Italy	7,176
Kirkdale[4]	Arica, Chile	6,830
Macona[7]	Buenos Aires, A. R.	1,527
Olaf[10]	Castries, St. Lucia	2,655
Stromboli[1]	Genoa, Italy	689
Minnesotan[8]	Rio de Janeiro, Brazil	7,624
D'Aosta[1]	Genoa, Italy	1,406
Ulysses[4]	Cristobal, C. Z.	12,038
Baron Lovat[7]	Bahia Blanca, A. R.	8,300
Mathilda[5]	Rio de Janeiro, Brazil	5,550
Veratyr[5]	Puerto Padre, Cuba	2,146
Trevethoe[11]	Buenos Aires, A. R.	6,223
Nankai Maru[12]	Mejillones, Chile	6,307

NEWPORT NEWS

Sverre[2]	Rio de Janeiro, Brazil	5,169
Trevalgan[2]	Rio de Janeiro, Brazil	5,995
Potosi[9]	Callao, Peru	1,157
Grove[2]	Cayo Francis, Cuba	1,474
Ocland[2]	Havana, Cuba	4,752
Harwood Palmer[7]	Cadiz, Spain	3,816
Addie M. Lawrence[5]	Alicante, Spain	3,764
Clarissa Radcliffe[6]	Genoa, Italy	8,650

PHILADELPHIA

Paris	Macoris	
Albert W. Robinson	Puerto Plata	423
Munorway	Havana	
Absalom	Cienfugeos	
Nordlys[3]	Tarragona	
Leonatus	Antilla	
Cibao	Santa Marta	

BALTIMORE

Greenland	Spain	138

[1] Pocahontas Fuel Co. [2] Berwind-White Co.
[3] Castner Curran & Bullit. [4] Baker-Whiteley Co.
[5] Smokeless Fuel Co. [6] Crozer Pocahontas Co.
[7] Virginia Coaling Corporation. [8] C. H. Sprague & Son. [9] West Virginia Coal Co. [10] C. & O. Coal Agency Co. [11] C. & O. Coal & Coke Co.
[12] Northern Coal Co.

Lake Markets

PITTSBURGH

Further sharp advances. Steel interests have bid ordinary buyers out of the market. Car supplies the poorest yet.

The market has passed altogether beyond bounds and in the local market the case is simply of consumers who must have coal at practically any price bidding against each other, with ordinary buyers completely frozen out. The fancy priced buyers are of course the steel interests, with relatively unlimited profits on their steel, say $25 to $50 a ton. Last week opened with Pittsburgh district coal being bought at $3.25 for steam and $3.75 for gas. The week closed with $3.75 done for steam and $4.25 for gas. That was one sensational rise coming on top of another, but an advance at the end of a week, when buyers endeavor to clean up scores and cars have become particularly scarce, is not in itself abnormal.

This week opened with a fresh sensation, for while cars usually accumulate over Sunday making supplies better than normal on Monday there were this week practically no cars on the Pan Handle on Monday and only about a 50% supply on the other divisions. At once the bidding became spirited, with $4 and $4.25 done on steam and $5 on gas coal. The lack of cars on the Pan Handle might have been expected to tend to bridge the gap between gas and steam coal, but the extreme shortages of cars for West Virginia gas coal was a more effective factor.

Slack is absolutely unquotable, while the differentials between mine-run and screened coal have become negligible. We quote the market at $4@4.25 for steam and $4.75@5 for gas coal, per net ton f.o.b. mine, Pittsburgh district.

BUFFALO

Bituminous advancing rapidly. Prices hardly quotable. Most feverish market in years. Reaction looked for, but not serious. Anthracite scarce as ever.

Bituminous—Probably not since the anthracite strike of 1902 has the bituminous market been in such a feverish, unquotable state as now. Prices advance almost daily and though most dealers expect them to advance to such levels that a reaction will be inevitable, they do not look to see anything like early summer prices resumed. While it is a fact that the great bulk of the coal is still going on spring contracts, there is so much difficulty in filling them that some shippers are at a loss to know what to do, as it is almost impossible to obtain the coal anywhere.

All quotations are little better than guesswork, for prices vary according to the needs and the temper of the buyer. Quotations are invariably made on the basis of the supposed readiness of the buyer to pay the prices, for it is not possible to discover anything like uniformity. In cases where the miners are making trouble, it is suggested that the operators propose to the consumers to pay the advance demanded and add it to the contract prices.

Quotations, as below, with half a dollar range, Buffalo proper paying the lower figure, are not likely to be effective any length of time. With contract prices based on $2.95 for Pittsburgh lump, single orders are about as follows, per net ton, f.o.b. Buffalo, all sizes nearly uniform:

Youghiogheny	$5.75@6.75
Pittsburgh	4.95@5.45
No. 8	4.80@5.30
Allegheny Valley	4.70@5.20
Pennsylvania Smokeless	4.85@5.35
All Slack	4.50@5.00

Anthracite—The scarcity of practically all sizes continues, with chestnut and stove leading. Shippers are unable to meet the demand, which is now at the maximum. The Buffalo retail trade is brisk and the demand for all-rail coal westward and into Canada is insistent, so that the movement by Lake remains slow, being for the week 64,900 tons, of which 19,600 tons cleared for Chicago, 12,800 tons for Duluth and Superior, 13,600 tons for Waukegan, 6,300 tons for Fort William, 5,500 tons for Ashland, 4,000 tons for Manitowoc, and 3,100 tons for Milwaukee.

Rates of freight are easier, on account of more tonnage offering, being $1 to Chicago, 85c. to Milwaukee, 75c. to Manitowoc, 50c. to Waukegan, 40c. to Ashland and 30c. to Duluth and Fort William.

The activity of the anthracite market is shown by the payment of from $1.50 to $2 premium for independent over the regular list price, which remains as follows:

Grate	$5.85	Chestnut	$6.35
Stove	6.10	Pea	5.00
Egg	6.10	Buckwheat	3.50

Prices are all f.o.b. cars, with 25c. per ton additional for delivering on board vessel.

TORONTO, CAN.

Coal supplies running short and some yards are empty. Bituminous especially scarce and prices increased. Pocahontas smokeless off the market.

There is a steady demand for coal both for domestic and manufacturing purposes, but supplies on hand are very short especially of bituminous. Deliveries from the mines have been much delayed and the car shortage has been getting worse. Prices are much unsettled with a decided upward tendency, quotations for best grades per short ton being as follows: Retail anthracite, egg, stove and nut $8.50; grate, $8.25; pea, $7.50. Wholesale f.o.b. cars at destination, bituminous three-quarter lump, $6.20; slack, $5.25; Pennsylvania smokeless, $6.50; slack, $5.25. Owing to fluctuations in price no reliable retail quotations for bituminous can be given. Pocahontas smokeless is practically off the market.

CLEVELAND

Increased demand from the West for spot shipments at fancy prices. Market stronger than a week ago. Industries increasing their capacities and using coal at a record rate. Car shortage the worst ever experienced.

There has been an increase in demand for coal from the West for 25- to 50-car lots for immediate shipment at fancy prices. These sales have brought prices which are not a true figure as far as the market in general is concerned as the majority of heavy consumers are now getting fair shipments and they refuse to pay more money. However, the demand is obviously not artificial and a good many buyers who sat back and waited for the break are now paying twice as much for coal as when it was first offered to them.

All industries are using coal at a record rate and as most plants are building additions, they will require more fuel as soon as their capacity is enlarged. The steel industries' new plants alone will require a great deal more coal and as most of these concerns are already booking orders a year ahead, there does not appear to be any let up in the demand in sight. The car supply is now the worst this section has ever experienced.

There are very few contracts coming up at present and nobody wants to even think of making a price for ten days ahead, let alone contracting for a year. One slack contract to run one year for 18,000 tons was made at $1.60 f.o.b. the mine for Pittsburgh No. 8 slack. Some operators believe that this price is higher than what will be asked next year, while others hold the reverse opinion. A contract for one car per day of three quarter coal to run one year, at $2.10 f.o.b. mine, has been turned down by more than one operator and jobber. These facts show the trend of opinion on the coming year's contract prices.

The local market has been a trifle weak on days when there has been any bunching of arrivals but the general price has been maintained in good shape.

Following are the market prices per short ton, f.o.b. Cleveland:

	Three-quarter	Mine-run	Slack
No. 8	$4.00	$3.90	$3.75
Cambridge	4.00	3.90	3.75
Middle Dist.	3.90	3.80	3.65

No quotations can be made on Hocking, Youghiogheny, Pittsburgh, Pocahontas and Fairmont grades.

DETROIT

Minimum quotations on steam coal now $3 with supply limited. Domestic fuel arouses stronger interest. Shipments of lake coal continue light.

Bituminous—There is no noticeable improvement in the supply of steam coal. Buying is in considerable volume with nut, pea and slack leading in favor. The mine quotation is $3 for all coal of this grade regardless of source; the same price is named on mine-run and three-quarter lump is at $3.25 for all varieties. In some cases, sales are said to have been made at even a higher price.

Cold rains and low temperature have created a more pressing demand for domestic coal. Retail dealers whose supplies are diminishing are finding it difficult to get orders filled with any degree of promptness. A mine price of $3.50 is quoted on Hocking domestic lump as well as for Kentucky or West Virginia lump, while smokeless lump and egg, which is even shorter is marked up to $4.50 at the mines.

Anthracite—Premiums up to $2 on stove size and $1.50 for chestnut are reported to have been offered some of the jobbers. Deliveries are hampered by the Grand Trunk Railroad's embargoes. Retail dealers are commencing to put in orders for further supplies.

Lake Trade—No improvement has developed in shipments over the Lake routes. The October total seems likely to fall short of September which in turn showed a marked decline from August. Carriers having contracts to execute, are finding it necessary sometimes to go to a second loading port to complete cargoes. The announcement by one shipper of an advance of 50c. a ton in the price of bunker coal has caused much dissatisfaction to owners. Coal for Lake Superior ports is being moved at the contract figure by independent carriers. Shipments to Lake Michigan command a higher figure.

COLUMBUS

Trade at a runaway stage with prices advancing by leaps and bounds. Car shortage growing worse and a coal famine threatened in many places.

The coal trade in Ohio has reached such a strenuous stage that it is approaching demoralization. Prices are unsettled as purchasers are more concerned as to deliveries than quotations. Buying is as active as conditions will permit and there are grave fears of a coal famine in many sections.

The domestic trade is probably attracting more attention now than any other department. In many cases dealers are almost entirely out of supplies and are unable to replenish them. Retailers are dividing up their available stocks in order to give all of their customers a small amount. Retail prices have again advanced and are the highest in years. Pocahontas lump is selling at $6.50 and West Virginia grades at $6. Hocking lump is quoted at $5.50 and dealers are unable to make deliveries. Anthracite is higher, chestnut being quoted at $10.

The steam business is in almost as chaotic condition as the domestic trade. Factories have no surplus on hand and many purchasing agents are anticipating a coal famine. Iron and steel plants are large consumers. Free tonnage is very scarce and any available stocks are gobbled up feverishly. Consumers are in a bad shape generally and a suspension in certain lines of manufacturing, is forecast, unless the coal supply is improved.

The Lake trade is still taking a considerable tonnage although docks are not as active as formerly.

The production in Ohio fields is growing steadily less because of the failing car supply. The Hocking Valley is now feeling the pinch and the car supply is only about 65 per cent. of requirements. Other roads are in worse shape and in some fields the car supply is scarcely more than 40 per cent.

Prices on short tons, f.o.b. mines, are as follows:

	Hocking	Pomeroy	Eastern Ohio
Rescreened lump	$4.00	$4.00	.....
Inch and a quarter	3.75	4.00	$4.00
Three-quarter inch	3.50	3.75	4.00
Nut	3.25	3.40	3.75
Egg	3.25	3.35	.....
Mine run	3.25	3.75	3.75
Nut, pea and slack	3.25	3.25	3.75
Coarse slack	3.15	3.15	3.65

CINCINNATI

Cold weather has added further stimulus to the market. Supplies inadequate, and hopes of improvement in transportation have been abandoned.

The coal market continues strong, with higher prices recorded during the past week than for years. Heavy rains have created a navigable stage in the Ohio River, enabling the shipment of considerable quantities of coal from the Pittsburgh district and West Virginia river points, but the weather has also been much colder causing emergency orders so that the additional supply will not appreciably affect the general situation.

With the car supply totally inadequate for a full run, and demands of the market stronger than ever before, prices are steadily rising. Sales of nut and slack of the better grades in Eastern Kentucky and West Virginia are reported at $2.25@2.75 per short ton f.o.b. mines, this being probably the highest price ever recorded for these grades. Domestic sizes and mine-run are quoted at corresponding figures, and as buyers are rapidly becoming panicky, further increases are probable. Industrial activity is on a large scale, making continued heavy fuel needs certain in the steam lines, and consumers are bidding freely for coal.

LOUISVILLE

Car and labor shortage puts market in turmoil. Litigation over numerous contracts expected immediately. Further advances in both wholesale and retail fields in effect.

Prices at approximately twice the normal for the season indicate the tenseness of the situation in this market. A series of suits involving construction of contracts is likely to begin shortly and it is expected that before the winter is over the court decisions will have added largely to the body of commercial law.

At this time, with election just ahead, there is some slacking up in the insistence of the industrial demand, with the business interests uncertain as to the future. After election, however, it is expected that the demand will be even more urgent and industries dependent on the Kentucky field may be compelled to slow down. The domestic prices in Louisville have taken a second advance and are now ranging around $5, delivered, for Eastern Kentucky, and $4.25 for Western Kentucky, with dealers declining orders except from old customers whom they are trying to take care of. It is half expected that Eastern Kentucky block will go to $4 shortly f.o.b. the mines.

Sales during the week have been made in eastern Kentucky, block at $3.50@3.75; egg, $2.75; mine-run, $2.75@3; nut and slack, $2.75. Western Kentucky lump is $2@2.25; mine-run, $1.50@2; egg, $1.50@2; nut and slack, $1@1.25, all f.o.b. the mines.

BIRMINGHAM

Situation acute with buyers in urgent need of coal. Railroads beginning to confiscate coal and a famine seems imminent.

The situation in the Alabama field is perhaps the most serious that has ever existed, even during the strikes of the past. Representatives of a large number of industries are in the district making strenuous efforts to secure steam coal to prevent a shutdown at their plants; some of these have contracts covering their requirements while others have not. Some of the large railroad lines dependent on this district for their fuel supply have also had special representatives in the field during the past week endeavoring to hurry the movement of coal on contract schedules, their chute supply being critically low, and one of the smaller lines had to confiscate coal to operate its trains during the past week.

Practically every mine is being flooded with orders and personal representations are being made instead of written ones, so urgent are the needs for fuel supplies. Coal has sold as high as $3.25 at mines and the supply of free coal is almost negligible in comparison with the demand. Many mines are operating on a 50% to 60% schedule and have contracts that absorb practically the maximum output that they can obtain. These contracts were nearly all made when coal was selling at a low figure and consequently operators are scarcely making a normal profit in spite of the panicky prices prevailing in the market.

The shortage of coal is due almost entirely to the failure of the railroads to supply equipment for loading. While it is true that there is some shortage of laborers and miners, the output could be materially increased with ample car supply. Practically all the railroads in the district have orders in for coal and box cars, but the delivery on these will be slow, and there seems to be no relief in sight in the near future, and a coal famine in southern territory is imminent.

Coke

CONNELLSVILLE

Spectacular advance in spot furnace coke. Merchant blast furnaces cannot follow the rise. Foundry coke uncertain.

Connellsville furnace coke for spot shipment sold at $1.50 per net ton at ovens in May, 1915. On Aug. 1 of this year it sold at $2.50. A week ago we quoted the market at $5@5.25 and noted predictions that $6 would be reached Saturday. As a matter of fact, $6.25 was done Friday and $7 Saturday, while this week opened with sales at $7.50, but offerings extremely light.

In present conditions the market may advance or decline $2 a ton overnight, because the limit of price which certain consumers can pay is passed while the limit others can pay is tens of dollars a ton higher. The merchant furnaceman, with a profit on the pig iron he is now trying to make and ship of less than $5 a ton, has one limit, while the steel interest, making its own pig iron, has a profit of $25 to $50 a ton on the steel. One may reckon the proportions at about 1.1 tons of coke per ton of merchant pig iron made, or 1½ tons of coke per ton of steel made.

The volume of sales of spot furnace coke is small, much below such a volume as would indicate that coke operators are holding back coke from contract customers and selling it at the fancy prices obtainable.

Negotiations on first-half contracts for furnace coke are practically suspended as regards merchant furnace interests, as of those not yet covered some would not pay even $3.75, while $4 was recently considered the minimum asked price and this price would hardly be quoted now. Steel interests, on the other hand are, if anything, more anxious to negotiate and it is possible that fancy prices may be paid. Meanwhile the contract market is quotable nominal on the basis of the last important sales.

Sellers of foundry coke have not kept pace with the rapid advance in spot furnace, it being practically impossible to do so while they have a desire to take care of their customers. Quotations outside of spot furnace are more or less nominal, but a fair group of quotations seems to be as follows: Spot furnace, $7.50; contract, $3.75; spot foundry, $5@6; contract, $3.50@3.75, per net ton at ovens.

The scarcity of coke is due to a variety of causes, slightly increased consumptive demand on account of furnaces working better, shortage of cars and labor. The extremely high coal market cannot be regarded as much of a factor, because when the regular coal mines with their car allotments built up by years of performance cannot get cars, the coke interests, without a reputation, could not expect to get cars for extra coal shipments.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 14 at 404,806 tons, a decrease of 11,320 tons, and shipments at 405,656 tons, a decrease of 9,672 tons.

Buffalo, N. Y.—The price of coke advances at such a rate that it is practically useless to make any quotations. It appears that the producers have given up all effort to meet the needs of the consumers and are asking fancy prices to stave off orders. Certain ovens have refused $10 per ton, oven price, because no coke was on hand. Actual prices are at least $1 more than they were five days ago, with foundry and furnace practically on the same level. A leading Connellsville shipper quotes for Buffalo delivery, f.o.b. $9.35 for foundry and furnace, $8.35 for high sulphur and $7.35 for stock coke. It is reported that certain iron furnaces in the Buffalo district will be shut down soon, from inability to get coke at any price.

Baltimore—It is almost impossible to get coke quotations here. All contract deliveries are far behind. Spot furnace coke is bringing as high as $6, and contracts over the year in some cases around $5.50. Sales are regarded generally as a favor, and the producers are merely sitting

pat and letting agencies and consumers battle for the fuel.

Birmingham, Ala.—The demand for furnace and foundry coke is steady, with supply of free coke limited. Foundry spot, $4.25@4.50, and for delivery over period of months $4 a ton at ovens. Furnace coke, $3.25@3.50, ovens. Healthy inquiries are received from California, Arizona and Texas territory, but the movement to these fields is limited by difficulty in securing equipment for the business that could be booked.

Middle Western

ST. LOUIS

Operators make a futile effort to head off orders by advancing prices to prohibitive levels. Cold weather accentuates the demand.

The most extraordinary market conditions this territory has ever known are now prevailing. For the past week there has been a tendency toward high prices principally because the operators have been sold up, and in order to prevent a further accumulation of orders, advanced their quotations. The demand, however, has been actual and as the price went up, the orders seemed to come in faster in anticipation of a further advance, and as a result the market is out of control.

The sudden cold snap this week was also a factor and caused an advance of 50c. a ton on wholesale and retail prices. When the temperature dropped to 25 deg., the call was so great that it was simply impossible to get spot coal at any price. The supply of equipment instead of getting better is plainly getting worse. This is largely due to the fact that the South is commencing to buy its winter coal and cars that move to the South do not come back to the coal fields.

Prevailing conditions are so unusual that it is next to impossible to state what may happen within the next week or so, but indications are that the $3 mark for high-grade coal will be reached the coming week, and by the first of December a still higher price may obtain.

The Williamson and Franklin County operators are sold up until about the first of December with one or two exceptions. The Springfield district is sold up ahead for at least three weeks, but in the Mount Olive and Standard fields they are usually able to promise shipment in two weeks' time.

The highest priced coal in the St. Louis market at present is Murphysboro Big Muddy lump, which is quoted at $3.50 f.o.b. mines with a 70c. rate. In the screening market Carterville and Standard are exceptionally strong with indications of going to $1.35 or $1.40 for Carterville and $1 to $1.15 for Standard.

The prevailing price at the present time is about as follows:

	Williamson and Franklin Co.	Staunton Dist.	Standard
6-in. lump	$2.75	$1.85	$1.75 to $2.00
6x3-in. egg	2.75	1.85	1.60 to 1.85
3x2-in. nut	2.75	.....	1.60
No. 2 nut	2.25	.....	1.50
No. 3	1.75	.....	.....
No. 4	1.50	.....	.....
No. 5	1.00	.....	.....
Screenings	1.20	.....	.90
Mine-run	1.75	.....	1.35
Steam egg	.....	.....	1.50
2-in. lump	.....	.....	1.50
Washed	.....	.....	.....
No. 1	2.75	1.85	1.75
No. 2	2.25	1.70	1.50
No. 3	1.75	1.50	1.40
No. 4	1.50	1.40	1.35
No. 5	1.00	1.00	.90

The rate on Williamson and Franklin County is 72½c. to St. Louis. On Staunton and Standard, 57½c.

KANSAS CITY, MO.

Situation becoming acute but mild weather has so far delayed a stampede for coal. Steam coal shipments light.

Mild weather until Oct. 20 prevented any serious trouble from the hampered shipments of domestic coal due to car shortage, and local supplies seem adequate to care for immediate demands. Shipments of domestic coal from the Missouri fields are coming in fairly well, but Kansas mines are overwhelmed; Kansas operators are said to be declining orders, because they cannot fill those now on their books, and many mines are idle for lack of shipping facilities. Shipments of semi-anthracite from Arkansas are 30 to 60 days behind.

The usual failure of the gas supply on the first touch of winter temperatures aggravated the local domestic situation. Many householders are turning to coal for cooking, as well as heating.

The steam coal situation is less serious than that in domestic coal, though shipments are 7 to 20 days behind.

Operators in the Arkansas field have refused to take on any more orders until the car shortage becomes relieved. Shipments in this field are already 30 days behind and this is increasing every day.

General Statistics

VIRGINIAN RY.

Shipments over this road for August amounted to 490,778 tons as compared with 445,900 tons in July.

EXPORTS BY DISTRICTS

Exports of domestic coal and coke from the United States and bunker coal laden on vessels engaged in the foreign trade, at the specified districts, during the month of August, 1916, were as follows:

District	Anthra.	Bitum.	Coke
Me. and New Hampshire	598	2	.....
Vermont	1,049	6,097	83
Massachusetts	272	101	.....
St. Lawrence	92,754	107,083	3,104
Rochester	48,173	193,581	1,260
Buffalo	160,334	145,704	28,158
New York	40,671	6,025	1,195
Philadelphia	9,435	134,161	5,134
Maryland	.....	104,795	14,557
Virginia	217	588,435	1,488
South Carolina	.....	9,451	.....
Georgia	.....	4	.....
Florida	.....	828	.....
Mobile	.....	27	.....
New Orleans	.....	2,551	53
Laredo	.....	351	1,057
El Paso	87	6,663	.....
Eagle Pass	.....	305	.....
Arizona	.....	5,901	11,114
Southern Calif.	2	2	544
San Francisco	.....	.....	1,356
Washington	.....	263	3,260
Alaska	.....	89	.....
Dakota	868	3,720	244
Duluth & Superior	27	2,757	67
Michigan	15	64,346	8,127
Ohio	39,742	1,001,341	154
Total	394,244	2,384,583	80,955

Bunker Coal

Maryland	53,550
New York	321,099
Philadelphia	42,258
Virginia	197,237

Financial Department

Colorado Fuel & Iron Co.

This company reports, in part for the year ended June 30, 1916, as follows:

Results—Gross earnings increased $9,048,566, or 54.7% over the previous year. Operating expenses were increased $6,467,538, or 43.7%. The net earnings from operation were $4,346,086, an increase of $2,581,027. Income from sources other than operation amounted to $624,991, making the total net income $4,971,077, compared with $2,261,101 in the previous year. After deducting bond interest, taxes, sinking fund, equipment renewal fund and cost of personal injuries under the Workmen's Compensation Law, all amounting to $2,769,906, there remained a surplus of $2 201,171, as compared with a deficit for the preceding year of $334,661.

A dividend of 30%, amounting to $600,000, was declared on the preferred stock, being one-half of the deferred dividends on that stock, leaving $1,601,171 carried to the credit of profit and loss.

Additions—The improvement in the business and earnings has made possible a program of new construction and additions to equipment, essential to the most profitable operation of the business. A byproduct coke plant of 120 ovens is to be built at the Minnequa Steel Works, and other additions and improvements at various points have been authorized during the year. The estimated cost of these authorizations, all of which are chargeable to capital account, is $3,300,000. The total amount unexpended on all authorized improvements at June 30, 1916 was $3,220,000. It is estimated that about 75% of this amount, which will be taken from accumulated earnings, will be expended during the current fiscal year.

Quarterly Statements—The publication of quarterly earnings statements has been authorized. The first one, covering the operations for July, August and September, 1916, will be issued in October.

Output—As a result of the greater operations at the steel plant, and a somewhat increased demand for fuel from the commercial trade, the coal production increased 912,436 tons, or 39%.

Wages—On Sept. 1, 1916, an increase of about 5% was made in the wages of coal mine employees. On the basis of present operations this will amount to approximately $20 000 per month, about half of which will fall on the steel works operations, and since the producing capacity of the developed coal mines in Colorado is far above the demand, causing low prices, it is doubtful if any considerable part of the increase in wages can be recovered through higher selling prices for the coal. This advance leaves the wage scale for coal mine operatives about 10% higher than is paid by Eastern competitors.

At the present operating rate, these various wage advances involve an annual increase in the payroll of about $1,250,000. The increases mentioned, both at the steel works and at the mines, were determined in conference with representatives of the employees.

Coöperation—Early in October, 1915, while John D. Rockefeller Jr. was visiting Colorado, the "Industrial Representation Plan" was brought to its finished state, and was thereupon, together with a wage agreement, adopted by a large majority vote of the coal mine operatives, as well as by the directors and subsequently, early in 1916, by a large majority vote by the employees of the steel works.

This plan provides for coöperation in improving the working and living conditions and also a simple and effective method whereby all grievances may be adjusted, either directly or through representatives of the employees selected by secret ballot. The President's industrial representative is constantly in the field and any grievances that he cannot satisfactorily adjust may be taken to any officer of the company, or to a joint committee composed of representatives of both the men and the company, or to the State Industrial Commission.

From the standpoint of both management and employees, the Industrial Representation Plan has been an unqualified success. The relations between the officials and workmen have become much more friendly and the understanding by each of the point of view of the other far more clear.

STATEMENT OF PRODUCTION FOR YEARS ENDING JUNE 30

Tons, 2,000 lb.	1915-16	1914-15
Coal	3,241,505	2,329,069
Coke	702,061	520,261
Iron ore	709,601	441,026
Limestone	369,513	344,033
Pig iron produced	339,968	268,661
Finished iron and steel	454,220	324,600

RESULTS FOR YEAR ENDING JUNE 30

	1915-16	1914-15
Iron department	$17,992,307	$10,885,451
Fuel department	7,634,298	5,692,589
Total gross earnings	$25,626,605	$16,578,040
Iron department	$4,062,592	$1,869,317
Industrial dept. (fuel)	283,494	loss 104,259
Total net earnings	$4,346,086	$1,765,058
Add—Inc. from secur's	492,007	370,508
Interest and exchange	132,984	125,535
Total net income	$4,971,077	$2,261,101
Deduct:		
Bond interest	$2,011,959	$2,016,213
Taxes	348,889	302,909
Real estate sink. funds	184,089	83,658
Insur., pers'l injur., etc.	58,000	74,494
Equipment renewal	145,000	80,000
Loss on Crystal R. R.R.	15,000	26,000
Prospecting	6,970	2,488
Preferred dividends (30%)	600,000	.....
Total deductions	$3,369,906	$2,595,762
Balance, sur. or def.	sur. $1,601,171	def. $334,661

BALANCE SHEET JUNE 30

Assets	1916	1915
Property	$62,801,090	$62,681,146
Cash on hand	4,237,278	2,675,325
Stocks and bonds	15,445,170	15,412,070
Accts. and bills rec.	4,162,139	3,409,476
Subsidiary cos.	203,135	332,037
Manufac'd stocks and supplies	3,761,528	3,301,232
Accr. divs. and int.	131,233	235,342
Miscellaneous	167,703	150,318
Total	90,909,277	88,298,946
Liabilities	1916	1915
Common stock	$34,235,500	$34,235,500
Preferred stock	2,000,000	2,000,000
Funded debt	x45,005,000	45,075,000
Accts. and bills pay.	1,028,011	698,202
Hospital	19,557	9,106
Accrued bond int.	826,995	828,003
Tax payment fund	100,000	100,000
Unpaid pref. div.	600,000	.....
Sink. fd.—real est.	1,841,039	1,656,950
Miscell. funds	331,049	319,904
Profit and loss	y4,922,127	3,376,281
Total	90,909,277	88,298,946

x Includes Col. Fuel & Iron Co. 5% gen. M. bonds, $5,758,000; Col. Fuel Co. 6% gen. M. bonds, $120,000; Grand River Coal & Coke Co. 6% 1st M. bonds, $853,000, and Colo. Industrial Co. 5% 1st M. bonds, $38,274,000.

y After deducting sundry amounts (net), $56,324.

Note—For previous annual report of this company see Vol. 9, p. 152.